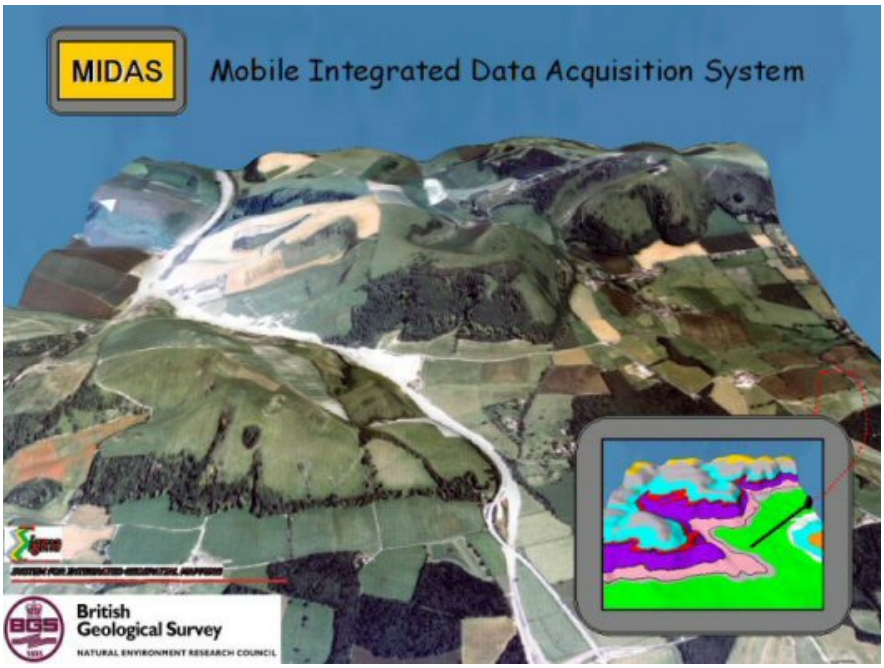
British Geological Survey
NATURAL ENVIRONMENT RESEARCH COUNCIL

Mobile Integrated Data Acquisition System (MIDAS) Version 1.0 User Guide

ISD Programme

Internal Report IR/06/055



BRITISH GEOLOGICAL SURVEY

ISD PROGRAMME

INTERNAL REPORT IR/06/055

Mobile Integrated Data Acquisition System (MIDAS) Version 1.0 User Guide

C J Jordan, E J Bee, N A Smith, K I G Lawrie, J Ford & A P Marchant

Keywords

Report; MIDAS, digital, field, data, capture, SIGMA.

Front cover

Picture of the MIDAS 'splash screen'

Bibliographical reference

JORDAN C J, BEE E J, SMITH N A, LAWRIE K I G, FORD J, MARCHANT A P. 2006. Mobile Integrated Data Acquisition System (MIDAS) Version 1.0 User Guide. *British Geological Survey Internal Report*, IR/06/055. 86pp.

Keyworth, Nottingham British Geological Survey 2006

BRITISH GEOLOGICAL SURVEY

The full range of Survey publications is available from the BGS Sales Desks at Nottingham, Edinburgh and London; see contact details below or shop online at www.geologyshop.com

The London Information Office also maintains a reference collection of BGS publications including maps for consultation.

The Survey publishes an annual catalogue of its maps and other publications; this catalogue is available from any of the BGS Sales Desks.

The British Geological Survey carries out the geological survey of Great Britain and Northern Ireland (the latter as an agency service for the government of Northern Ireland), and of the surrounding continental shelf, as well as its basic research projects. It also undertakes programmes of British technical aid in geology in developing countries as arranged by the Department for International Development and other agencies.

The British Geological Survey is a component body of the Natural Environment Research Council.

British Geological Survey offices

Keyworth, Nottingham NG12 5GG

☎ 0115-936 3241 Fax 0115-936 3488
e-mail: sales@bgs.ac.uk
www.bgs.ac.uk
Shop online at: www.geologyshop.com

Murchison House, West Mains Road, Edinburgh EH9 3LA

☎ 0131-667 1000 Fax 0131-668 2683
e-mail: scotsales@bgs.ac.uk

London Information Office at the Natural History Museum (Earth Galleries), Exhibition Road, South Kensington, London SW7 2DE

☎ 020-7589 4090 Fax 020-7584 8270
☎ 020-7942 5344/45 email: bgslondon@bgs.ac.uk

Forde House, Park Five Business Centre, Harrier Way, Sowton, Exeter, Devon EX2 7HU

☎ 01392-445271 Fax 01392-445371

Geological Survey of Northern Ireland, Colby House, Stranmillis Court, Belfast, BT9 5BF

☎ 028-9038 8462 Fax 028-9038 8461

Maclean Building, Crowmarsh Gifford, Wallingford, Oxfordshire OX10 8BB

☎ 01491-838800 Fax 01491-692345

Sophia House, 28 Cathedral Road, Cardiff, CF11 9LJ

☎ 029–2066 0147 Fax 029–2066 0159

Parent Body

Natural Environment Research Council, Polaris House, North Star Avenue, Swindon, Wiltshire SN2 1EU

☎ 01793-411500 Fax 01793-411501
www.nerc.ac.uk

Foreword

This document has been written to guide users through the Mobile Integrated Data Acquisition System (MIDAS). It is the product of a British Geological Survey (BGS) programme to develop digital data capture systems for use in the field.

Acknowledgements

MIDAS has taken several years to develop. During this time, software and hardware specifications have improved significantly while the underpinning data capture concepts and model have largely remained the same. The authors would therefore like to acknowledge the work of all the digital field data capture team over the past four years, in particular Russell Lawley, Andrew Howard, John Laxton and Bruce Napier. Furthermore, the MIDAS system could not have been developed without the comments and feedback of our dedicated teams of field testers including Maxine Akhurst, Helen Burke, Tony Cooper, Andy Farrant, Martin Gillespie, Nick Golledge, Mike Hall, Mat Hardenberg, Holger Kessler, Simon Price, Andreas Scheib and Chris Thomas.

Contents

Summary

This report serves as a user guide to the Mobile Integrated Data Acquisition System (MIDAS) otherwise known as the digital field slip, which was developed within the SIGMA (System for Integrated Geospatial Mapping) programme. This document is designed to accompany a two-day training course that introduces staff to the hardware and software.

1 Introduction

MIDAS, the Mobile Integrated Data Acquisition System was developed within SIGMA (System for Integrated Geospatial MApping) and latterly the 3DG Programme and is designed as a form of digital field slip to enable field staff to collect their field data digitally. The digital field slip runs on a Tablet PC running Microsoft XP for Tablet Edition while the map interface uses a customised version of ESRI ArcMap and MS Access. The Tablet PC is an rugged Itronix DuoTouch GoBook, which has an outdoor-readable screen with touch screen facility via a stylus/pen device.

This document accompanies a two-day introduction to the hardware and software.

2 Hardware - The Tablet PCs

Having tested many Tablet PCs, BGS has opted for the Itronix GoBook. We have a small number of 'classic' GoBooks as well as the newer DuoTouch GoBooks. The DuoTouch systems have an integrated GPS (as opposed to a Bluetooth set up), and the screens can be switched easily between active and passive mode, and they have increased RAM and processor speeds over the classic models.

The Tablet PCs have been set up in the same was as BGS laptops with a C: drive for application programs and a D: drive for data. They have the standard suite of BGS software including MSOffice and ArcGIS9. The PCs are set up to link to the BGS network using DHCP and they have a modem for internet access when off-site (refer to Appendix 1 which is also available as a word document with a shortcut on the Tablet PC desktops).

2.1 THE ITRONIX GOBOOK SPECIFICATIONS

BGS has purchased Itronix DuoTouch GoBooks that have the following specifications (specifications in brackets refer to the 'classic' GoBook and if no brackets exists then both have the same specs):

Operating system Microsoft Windows XP Tablet PC Edition

Processor P4 1.1Ghz (*PIII ULV 933MHz*)

RAM 1280Mb (*640Mb*)

Hard disk 40Gb (shock mounted)

Screen 8.4" SVGA TFT outdoor transmissive display with digitizer control touch screen. Screen protectors have also been purchased in order to extend screen life. (*Classic only has active mode*)

Ruggedness Die cast magnesium for structural component giving an IP54 rating for ruggedness, *i.e.* will withstand heavy rain, dust and 26 3ft drops onto plywood over concrete

Communications 56 Kbps modem and 10/100 Mbit Base-T Ethernet LAN, Bluetooth

Interfaces PC card slot for (1) Type I or Type II card with 32 bit card bus 2.1 interface, compact flash slot for (1) Type I or II card, built-in RJ-11 and RJ-45 jacks for integrated fax/modem, 2 USB 2.0 connectors, 26 pin docking connector

Input Digitizer control panel touch screen with stylus, mini keyboard via USB port

GPS Integrated GPS in the DuoTouch only.

These specifications can be compared against the requirements specifications defined by the requirements report (Farrant, Jordan & Thomas, 2001) that is available at \\kwsan\store\Publications\Documents\IR\2001\IR01137.pdf. These requirements are summarised in tabular format in the following interim report (Jordan, Ford, Bee, Napier & Lawley, 2002) \\kwsan\store\Publications\Documents\IR\2002\IR02190.pdf. The GoBook specifications exceed the requirements outlined in the above documents e.g. lighter than specified etc.

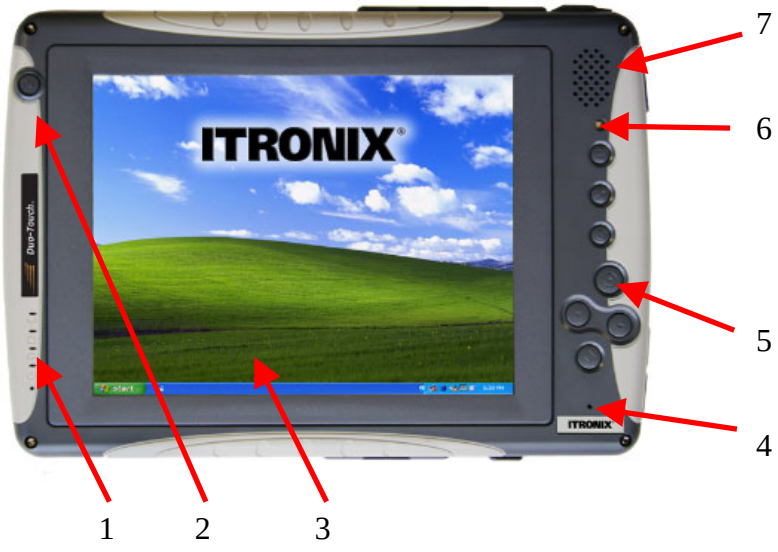
Each MIDAS field kit contains all of the following equipment, and it is recommended that you check that everything is present and is in working order before leaving for the field:

- GoBook Tablet PC with specifications noted above
- Desk mount including capacity to charge two expansion battery packs
- Carrying options Glove system directly attached to the GoBook, protective case with hand strap, 2 point shoulder strap and a 4 point harness
- Mini keyboard (connected via USB)
- Cigarette lighter adaptor for additional power source
- Two expansion battery packs
- USB CD/DVD reader/writer
- 1Gb USB data stick

2.2 GOBOOK PARTS

The following diagrams are available in the help document on the GoBook but an introduction is provided here. The DuoTouch has a GPS antenna extending from (6) below.

2.2.1 Front view



1. LED status indicators (see below)
2. Power button to turn on/off or suspend
3. Screen (see below)
4. Microphone
5. Hot Keys (see below)
6. Light sensor
7. Speaker

1 LED Status indicators

LED / Icon	Light	Description
1. Wireless Radio Status LED	Solid Blue	When integrated radio(s) are powered

	Blinking Blue	When integrated radio is active e.g. when using the integrated GPS
2. HDD Status LED 	Green	When accessing the Hard Disk Drive
3. Battery Status LED 	Green	Fully Charged
	Orange	Charging
	Blinking Red	Battery capacity is less than 10%
4. Power Status LED	Solid Blue	Unit is turned on
	Blinking Blue	Suspend to RAM

2. Screen

This is an SVGA TFT active matrix colour display. It is transmissive to provide readability indoors and outdoors. You can increase the brightness by pressing FN+Rotate or FN+Security to decrease brightness (Hot Keys are illustrated below). Change it from Active to Passive by holding down the Line Up and Line Down keys simultaneously.

Rather than using a conventional mouse, the Tablet PCs use a stylus as follows:

Mouse function	**Stylus function**
Single-click	tap once with the stylus
Double-click	tap twice with the stylus
Right-click	tap once while holding down the button on the stylus
Mouse-rollover	Hover the stylus over the display to see a description, (this only works in Active screen mode).

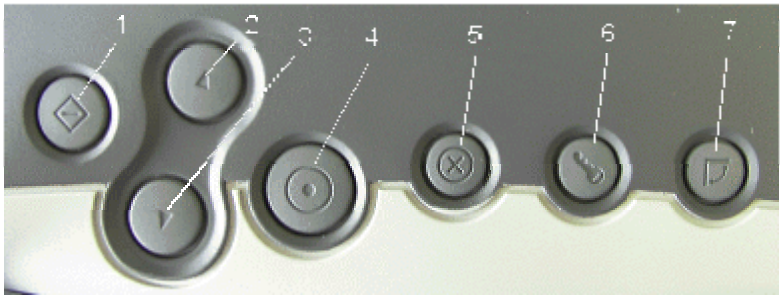
A mouse can be plugged into one of the USB ports if required.

Each person holds the stylus in a different way e.g. vertically or at a range of angles, so **it is recommended that you calibrate the screen** as follows. Double-tap on 'Table and Pen Settings' in Control Panel, then tap on the Setting tab and then press the Calibrate button and follow the instructions.

A screen protector has been supplied with the GoBook to extend the life of the screen.

5. Hot Keys

The GoBook has hot keys that are equivalent to function keys on a desktop PC.



1. Function	5. Escape
2. Line up	6. Security
3. Line down	7. Rotate
4. Enter	

Function key – press this key in combination with another key to perform more functions. Press it and hold while pressing another hot key to perform the key combinations below.

Line up key – press this to move the cursor up one line

Line down key – press this to move the cursor down one line

Enter key - press this key just like you would press **Enter** on a desktop computer. For example, implement an action, navigate deeper or move forward through content.

Escape key – press to go back or escape to the previous context or window

Security key – press this as you would **Ctrl+Alt+Del** on a desktop PC

Rotate key - to switch between portrait and landscape. Note that MIDAS has been designed to work in landscape mode.

Line up and Line down pressed simultaneously changes Active/Passive screen modes

Function key and Hot Key combinations:

Fn + Line up – page up

Fn + Line down – page down

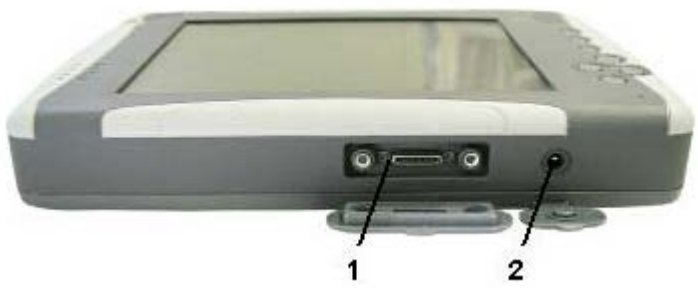
Fn + Enter – speaker volume down

Fn + Escape – speaker volume up

Fn + Security – reduce display brightness

Fn + Rotate – increase display brightness

2.2.2 Bottom edge

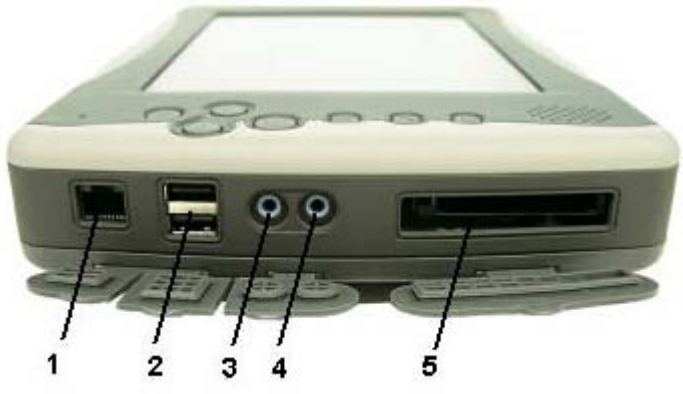


1. Extension slot (for use with the desk mount
2. DC-in jack to connect the power cable

2.2.3 Top edge

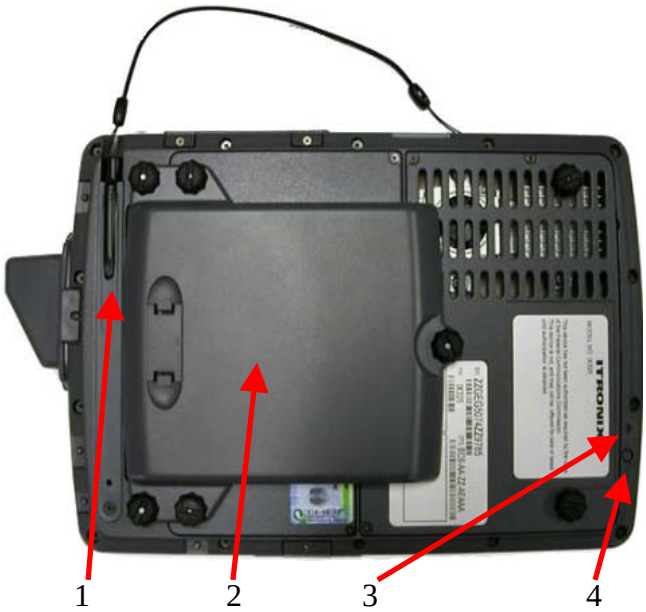
1. Fax/modem RJ-11 jack (suitable for analogue lines, ISDN may damage the modem)
2. Type II PC card slot
3. Security slot.

2.2.4 Right side



1. LAN RJ-45 Jack – use this to connect to the BGS network
2. USB 2.0 ports
3. Audio-out jack (for external speakers)
4. Audio-in jack
5. Compact Flash slot

2.2.5 Back view



1. Stylus holder
2. Main battery and connector for extension battery
3. Master reset key. **Insert a paper clip to perform a reset**.
4. RF power On/Off button. This will turn on/off the integrated Bluetooth and WLAN radios (this affects GPS operation)

2.3 TURNING ON AND LOGGING ON TO THE TABLET PCS

The GoBook's ON/OFF buttons are on the top left of the units. You can log on locally or link to the BGS network.

If you have an external keyboard and/or mouse plugged into the USB ports you can use these to log on. Otherwise simply wait a moment and the virtual keyboard will appear and you can enter your details by tapping on the screen using the stylus. Remember to press the Security Key in the same way that you would use **Ctrl+Alt+Del** on a desktop PC.

When the PCs are turned on the interface is the same as the BGS laptops and you are prompted for your UserID, password and domain. You have two choices:

1. Log on locally as Username: Groupid (or User1 for MH users)

Password: *not written here for security reasons*

Log on to: KPW197xxx (this computer)

Even if you log on locally you can still enter data to the field slip under your own BGS UserID, as shown later in this document.

2. Log on using your own BGS ID. The first time you do this you must be linked to the network so that your profile can be downloaded. After you have successfully logged on once you can subsequently log on using your BGS ID to the AD domain WITHOUT being linked to the network.

3. Right-click on the Desktop and select Properties, then Screensaver and ensure that it is set to **None** or the screensaver will conflict with the GPS.

2.4 BATTERY SETTINGS AND CHARGING

Each GoBook PC has three batteries. The main battery is screwed into the back of the PC and should never need to be removed in the course of fieldwork. The other two are expansion batteries that can be attached onto the back of the unit in a piggyback system. Only one expansion battery can be used at any one time. The main points to note regarding battery usage are:

- The main battery on the GoBook has a 3.6 hour life, and each expansion battery has the same again.
- Set the system to Standby as you travel between exposures unless you require the PC for navigation.
- The batteries are Lithium ion so it is best to run them down before recharging them or they will retain a charge memory and lose charge capacity.
- When using the Tablet PCs in the office or your field base **do not** run them from the mains unless they require a charge – just as you would with a laptop.

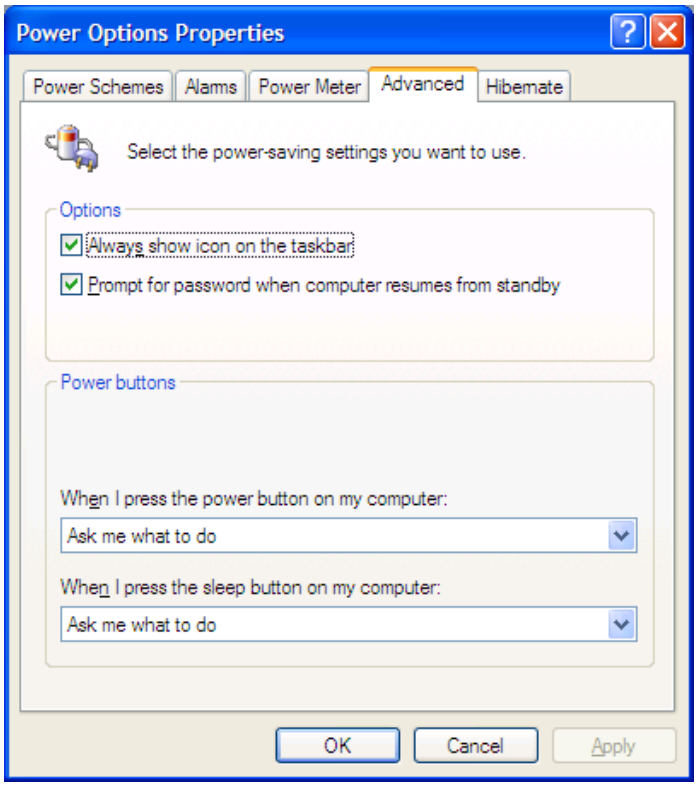
When you start mapping each morning you will not need to have an expansion battery attached to the tablet, and this will reduce the weight you need to carry. When the battery runs low you can add the first expansion battery, and replace it with the second one later in the day if necessary.

The Desk Stand will enable you to charge the main battery and both expansion batteries. Each Tablet PC is also supplied with an additional power adaptor to enable charging via the cigarette lighter adaptor in the vehicles.

To conserve power it is recommended that you ensure the Power Options in the Control Panel so that the system sets itself to Standby after a set number of minutes. It is set to 5 minutes but you can increase this is you wish. You can also set an alarm (which is very loud!) to sound when the battery power is at a specified percentage, and so that the hardware will automatically hibernate when battery power is at another level. Just like laptops, there is a battery indicator icon on the bottom right-hand corner of the screen and if you hover the stylus over the icon you can find out the percentage power left and the predicted time that will last for.

It is also recommended that you set the Power Button option in the Advanced tab of the Power Options Properties window (found in the Control Panel) so that the PC asks you what action you want applied when you press the Power Button (as shown below). With this setting you can then choose Off, Standby or Hibernate etc.

If you notice that the battery life is decreasing after a period of time, you are advised to recalibrate the batteries.



3 Software

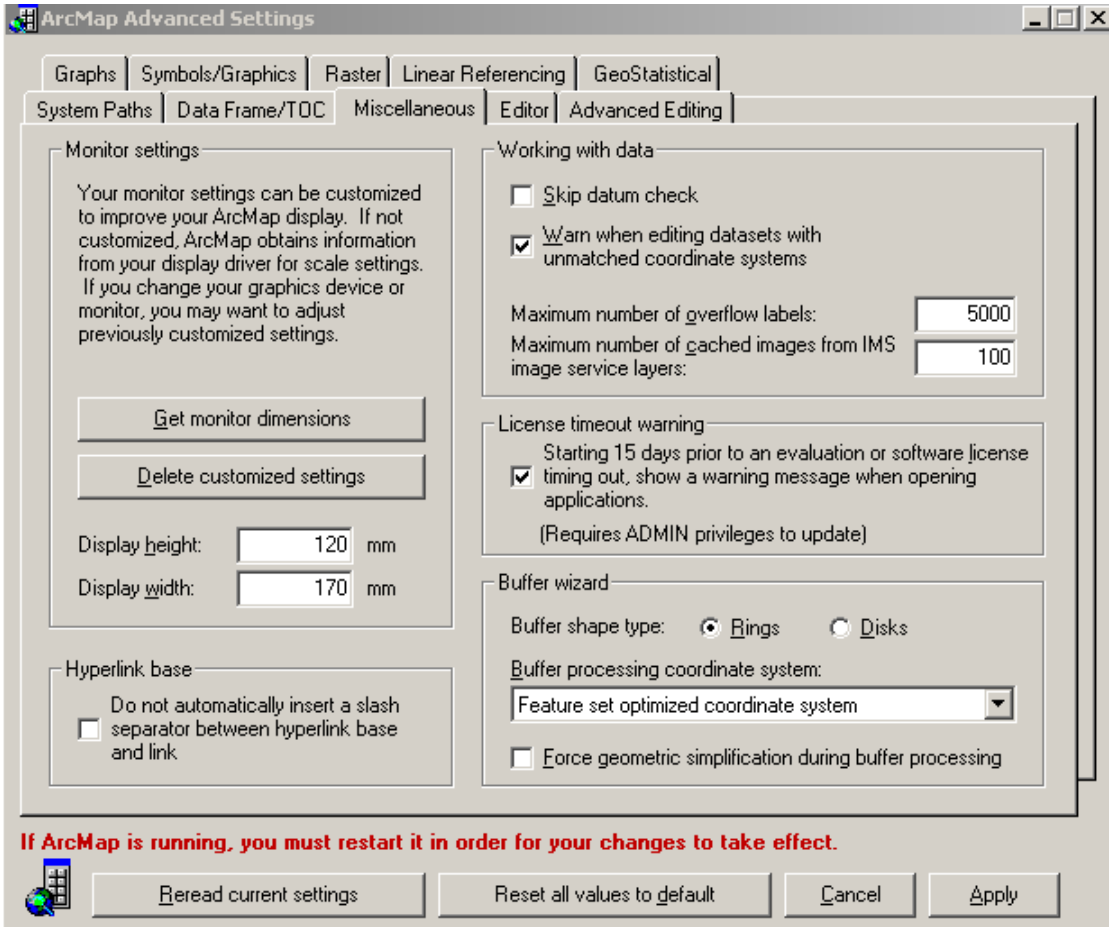
3.1 SYSTEM REQUIREMENTS

MIDAS has been developed using ESRI's ArcGIS 9.1 software. It is built onto a relational database that has been built in Access 2003 with service pack 2. It is important that all users of MIDAS use these versions of the software for this release of MIDAS otherwise they may experience problems with some of the functionality. The BGS Sketch Tool and the BGS Structure contour tool require additional installation.Data transfer to the GSD relies on the GSD being installed on the tablet PC.

3.2 CALIBRATING THE SCREEN DISPLAY SCALE

In order for the screen map in ArcGIS to represent the true scale (10cm = 1km when measured on the screen) you need to calibrate the map display. You can only do this if all ArcGIS applications are closed.

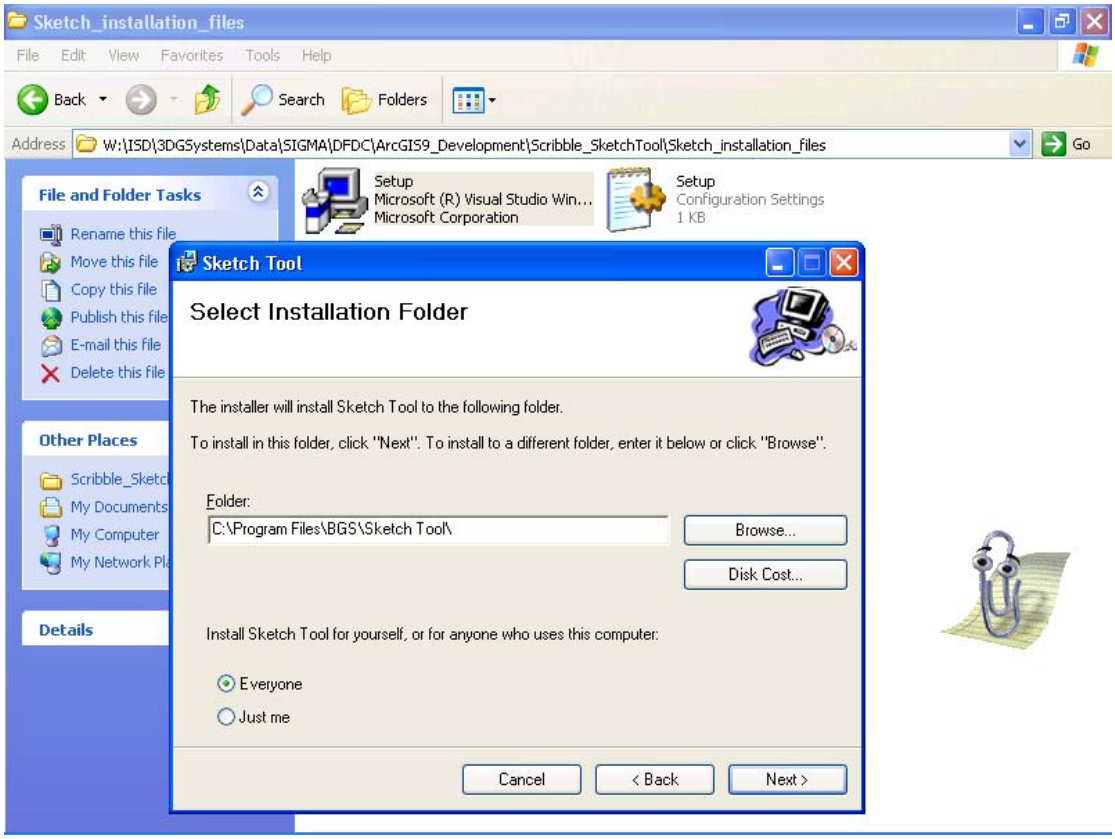
To modify the settings, locate and open the AdvancedArcMapSettings.exe under :\Program Files\ArcGIS\Utilities. Select the miscellaneous tab and set your monitor settings to the actual monitor settings. For GoBook this should be height 120mm and width 170mm. Press apply and close. ArcMap should now be calibrated accordingly.



3.3 SETTING UP SKETCH PROGRAMME

If the sketch tool has already been installed (check under the programs menu), there should be no need to repeat the process unless a newer version ahs been released.

1. Log on to the tablet under your profile on the AD domain.
2. Navigate to \\kwsan\WorkSpace\ISD\3DGSystems\Data\SIGMA\DFDC\ArcGIS9_Development\Scribble_SketchTool\Sketch_installation_files
3. Run the Setup.exe file (you can run this from the SAN), there is no need to copy the files locally.
4. The following window should appear, make sure you install the file to the default setting (as shown below). If you do not do this, the sketch facility will not work within the MIDAS system. Make sure you choose “everyone” – this ensures the programme is available under Groupid.



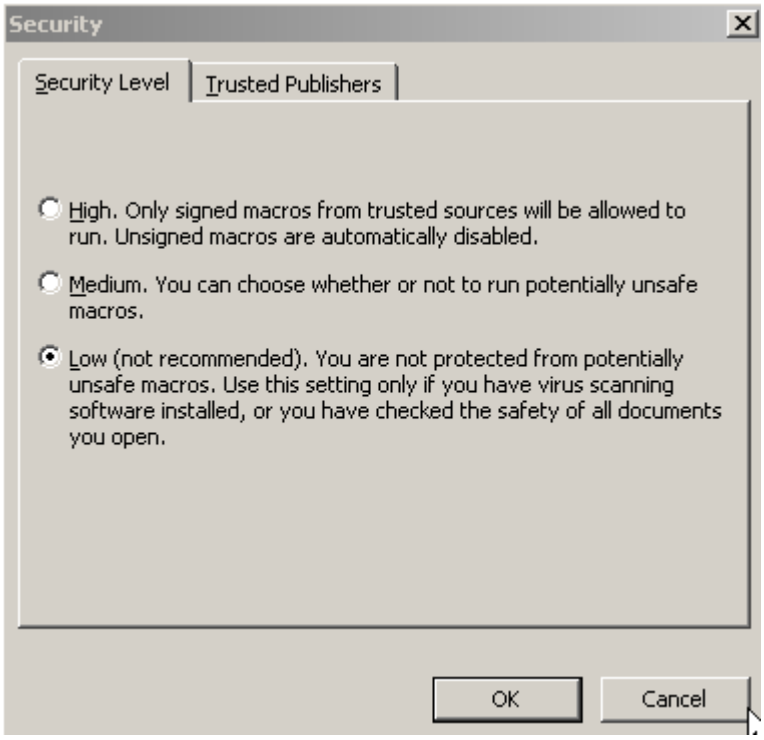
5. Press next on all proceeding menus and press close once installation is complete.

3.4 STRUCTURE CONTOUR TOOL INSTALLATION

1. Close ArcMap if you have it open.
2. Copy the folder to the tablet. These files need to be stored locally on the machine for the tool to work. You can put it in D: W:\ISD\3DGSystems\Data\SIGMA\DFDC\ArcGIS9_Development\Structure_contour_tool\VB\Install\Structure Contour Tool
3. Run the setup.bat file found in the folder just copied to the D drive.
4. Press yes to add to the registry and then ok.
5. Open MIDAS or ArcMap. The structure contour tool acts like a toolbar in ArcGIS and will need to be turned on if the user wishes to view it. You can go to view/toolbars/structure contour tool

3.4.1 Access 2003

For some of the macros to work, the security code needs to be set to Low. To do this, open up Access 2003 from the programs menu and go to Tools>macro>security. Once this has been done, it should not need modifying again.



3.5 CHECKING REFERENCES IN ARCMAP

1. Open ArcGIS (not MIDAS until you have checked the references exist).
2. Open the VBA code by navigating Tools/Macros/ visual basic editor.
3. In the Visual basic project go to tools, references.
4. The précis tool relies on two references. Check that these are exist in the list and are turned on. The first is the Rich text box control 6.0 (SP4) (browse to RICHTX32.ocx in C:\Window\system32). The second is Microsoft Office document imaging 11.0 type library.

If the references do not exist, you will need to browse for them. They are .ocx files rather than .dll i.e. the Rich text file is called RICHTX32.ocx.

3.6 GSD

The GSD should be installed on the tablet PC'S. Copy the latest GSD version from the GSD folder on the S drive. Once on the tablet copy the Object Class extension folder from GSD35 into the ArcGIS folder on the Tablet and run the Install.bat file within this folder. Then install the fonts within the GSD35/Fonts folder (double click on each file to do this). The GSD will now be set up on the tablet, which will mean that the Field GSD will work. Follow the README.txt file in the GSD folder if you encounter problems.

3.7 SETTING UP A PROJECT

Data can either be added to a blank MIDAS.mxd or if a project GIS is already set up, layers can be dragged or dropped between the project GIS and the empty MIDAS GIS. It is important that the MIDAS layers; GeoPoly, GeoLine, Map Face Note, National Grid QS and TestPointProjection remain in the project for the system to work.

4 Global Positioning System (GPS)

The Itronix GoBook Duo-Touch Tablet PCs have a built-in Global Positioning System (GPS). BGS also has seven of the original GoBook Tablet PCs which do not have integrated GPS so we use these with NAVMAN Bluetooth GPS. Instructions on how to set up the GPS to link to MIDAS are given later in the manual. The older GoBooks without integrated GPS will either be based in the office for use by the developers or for other indoor application such as core logging at a core store.

The Bluetooth GPS we use are the Navman 4000 BT series. Each receiver delivers over 30 hours of use from three AAA batteries. They can also be powered from the cigarette lighter adaptor that has been supplied. The Navman has no screen interface so information on the satellite fix and current location is delivered to the geologist through ArcMap, as outlined later in this document.

The Navman units are very straightforward to use and instruction manuals are supplied with each GPS, but a summary is included here. Press the white On/Off button on the top of the unit to activate the GPS.

- If the button flashes red then the battery power is low.
- If the button emits a series of double blue flashes then the GPS is operating but the Tablet PC is not receiving any communication. The GPS is ALWAYS sending out data using the NMEA protocol, so this means that the Tablet PC needs to be set up to receive the signal.
- If the button flashes approximately once per second, it is communicating successfully with the Tablet PC. Bear in mind however that it can communicate successfully with the Tablet but not actually have a satellite fix; this will be apparent via the ArcMap interface.

5 The Digital Field Slip

The digital field slip has been developed using ArcGIS 9 and a personal geodatabase in Access 2003 which is viewable in Access 2000. Access 2003 offers greater capabilities than Access 2000 for use on the tablet PC's, especially in terms of handwriting recognition support.

The digital field slip should be treated in much the same way as a paper field slip, the only difference is that data are captured digitally. On a paper field slip, geologists make notes and observations by drawing lines, polygons, map face comments and points with labels to reference their geological notebook observations. The same is true in the digital field slip. Any geological lines or landforms created using the digital field slip should be "inked in" in the GSD on return to the office in much the same way a paper field slip is inked in.

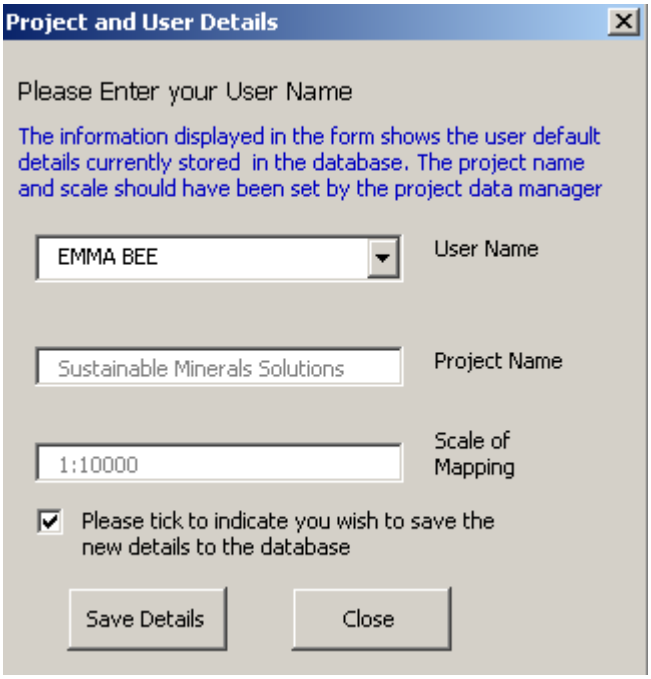
5.1 OPENING THE MIDAS GIS

Please note that if you are using the integrated GPS with the DuoTouch GoBook you must set up the GPS before you start MIDAS. The relevant instructions are provided later in this manual.

Like the GSD, MIDAS fires code in the background whilst the system is being loaded. For this to work, the application needs to be opened either through a shortcut from the desktop to the .mxd itself or by double-clicking the .mxd in Windows Explorer. If the application is opened via ArcMap, you will come across an error in the code and will not be able to use the system. This is because ArcMap temporarily looks for the geodatabase in a bin folder rather than to its real

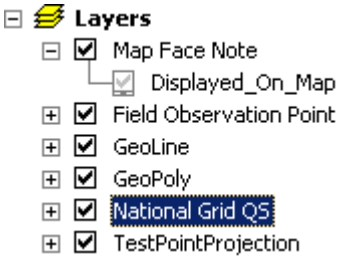
location. For ease, and to reduce the risk of this error, you should create a shortcut on the tablet PC's to the MIDAS.mxd.

Once the MIDAS GIS is opened, and after the splash screen has closed, a dialogue box will be displayed showing the user the project and user details which are currently in use. These are default settings, which are added to any data captured during fieldwork so that, in the future, it can always be determined who captured the data, when and for which project. The user can change the user name shown here to their own by selecting their name from a list of user names displayed in the dropdown list.



If a valid username does not exist in the dropdown list, or any of the project details are incorrect, the user will have to access the populate user dictionary form through the project details button and make the appropriate changes here. This will be covered in section 4.2.1

MIDAS relies on particular layers to store field observations. These will appear in the table of contents when you open the GIS. They should not be renamed or removed , if they are and you use one of the MIDAS tools you will be alerted by a message box saying that the layer cannot be found. The layers which are specific to MIDAS are:

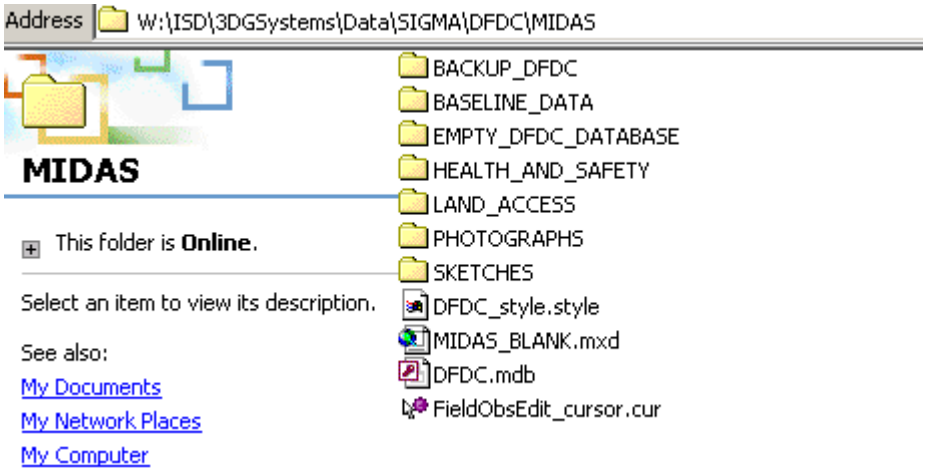


These are all stored in the DFDC.mdb file.

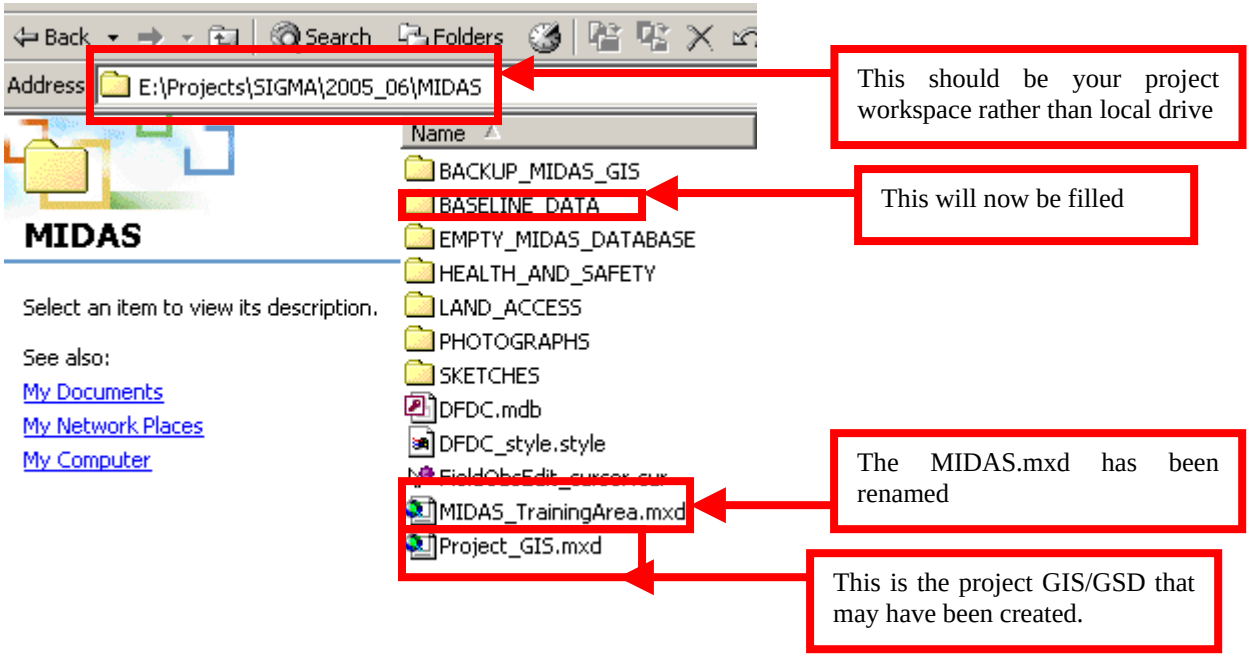
5.2 PREPARING MIDAS FOR FIELD USE

An empty MIDAS application and empty file structure can be obtained from W:\ISD\3DGSystems\Data\SIGMA\DFDC\MIDAS_System\EMPTY_MIDAS. Your data manager should copy the MIDAS folder to the project workspace – or integrate it with their

existing project workspace if they have already collated data. The MIDAS folder will eventually be copied to the Tablet PC in its entirety.



Before going into the field, your project data manager may have set up a project GIS or GSD with the relevant topographic maps, Digmap line work, historic maps etc for the area in which you are mapping. All of this baseline data should reside in a folder called “BASELINE_DATA”. The project GIS should reside just above this. You need to copy and paste the project GIS and the baseline data folder into the MIDAS directory structure. As the baseline data folder in MIDAS is initially blank, it won’t matter if it is overwritten. Alternatively, If the project GIS is not set up using the GSD, it can be set up in the MIDAS GIS, this way, a separate project GIS is not needed.



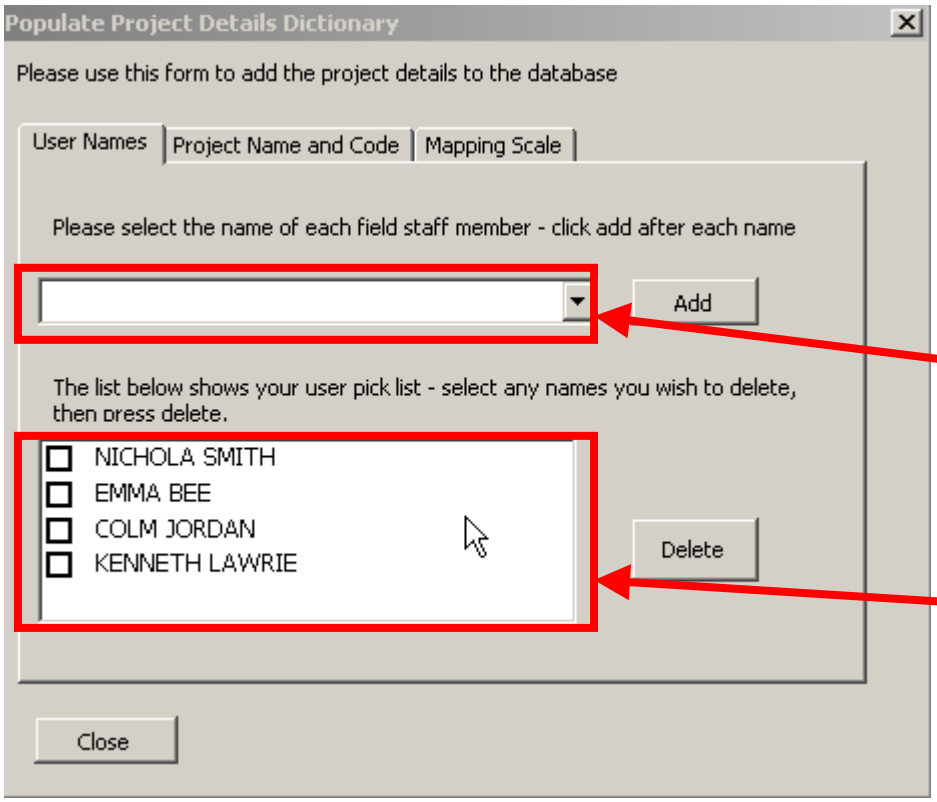
If a project GIS has been set up, like in the example above, then so long as it has been created in ArcGIS 9 or above, you should open both the project GIS and the MIDAS GIS on your office PC and simply drag and drop the data from the table of contents (TOC) in the project GIS into the TOC of the MIDAS GIS. The data manger could do this for you, so that all project staff take the same GIS into the field. The MIDAS.mxd can be renamed to reflect the project or the user. The DFDC database **MUST NOT** be renamed.

Once the data has been copied from the project GIS into the MIDAS GIS, the project GIS can be removed from the MIDAS file structure. MIDAS uses relative paths, so when the GIS is opened, all the data should be viewable.

5.2.1 Setting up project details

The data manger should set up the project details before going into the field. This ensures all field staff have the correct data and dictionary values before leaving the office. As mentioned before, when you first open the MIDAS GIS you'll be prompted to check the default details. When creating the MIDAS GIS for project use, these default details are likely to be incorrect. The data manger will need to amend these by pressing the populate project details dictionary button in the GIS. A form will appear with three sections.

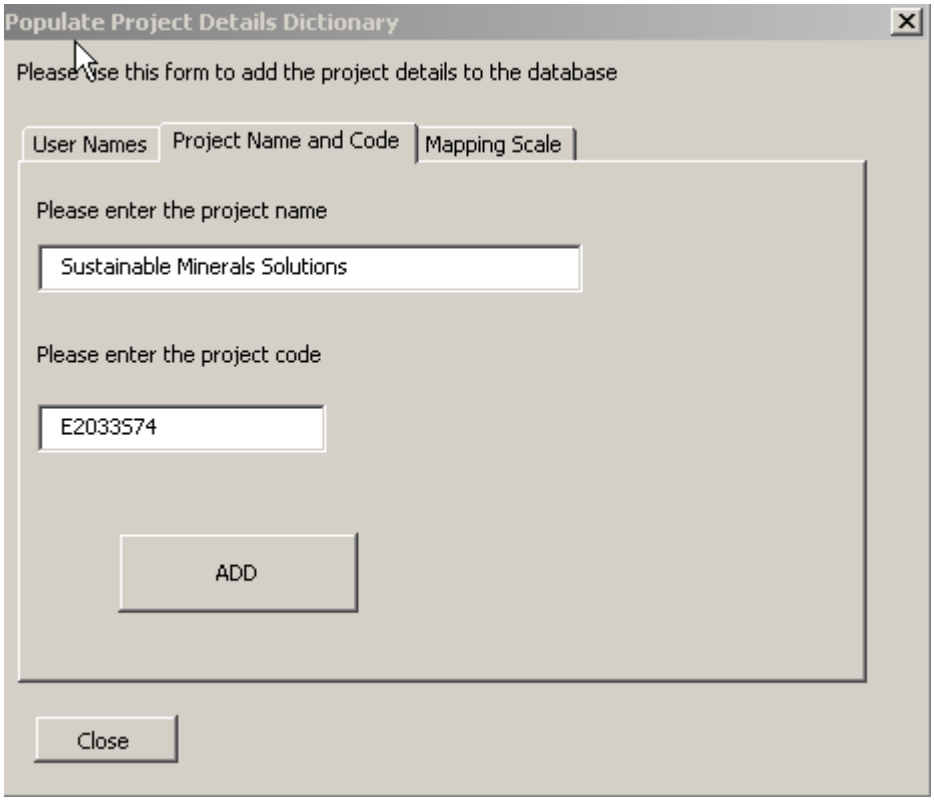
Section 1 – User names



This list refers to a list of names and usernames in the geodatabase that are stored in the table called: DIC_META_ORACLE_USER. You can type in a name and it should appear in the list. You can then select it and add it to the list below. If the name you require does not appear, the data manger will have to add it to the table in the Access database.

This is the list which appears in the project/user details form (button 16a). The user can add or remove names from that list on this form. To delete a name, select it and press delete on the form.

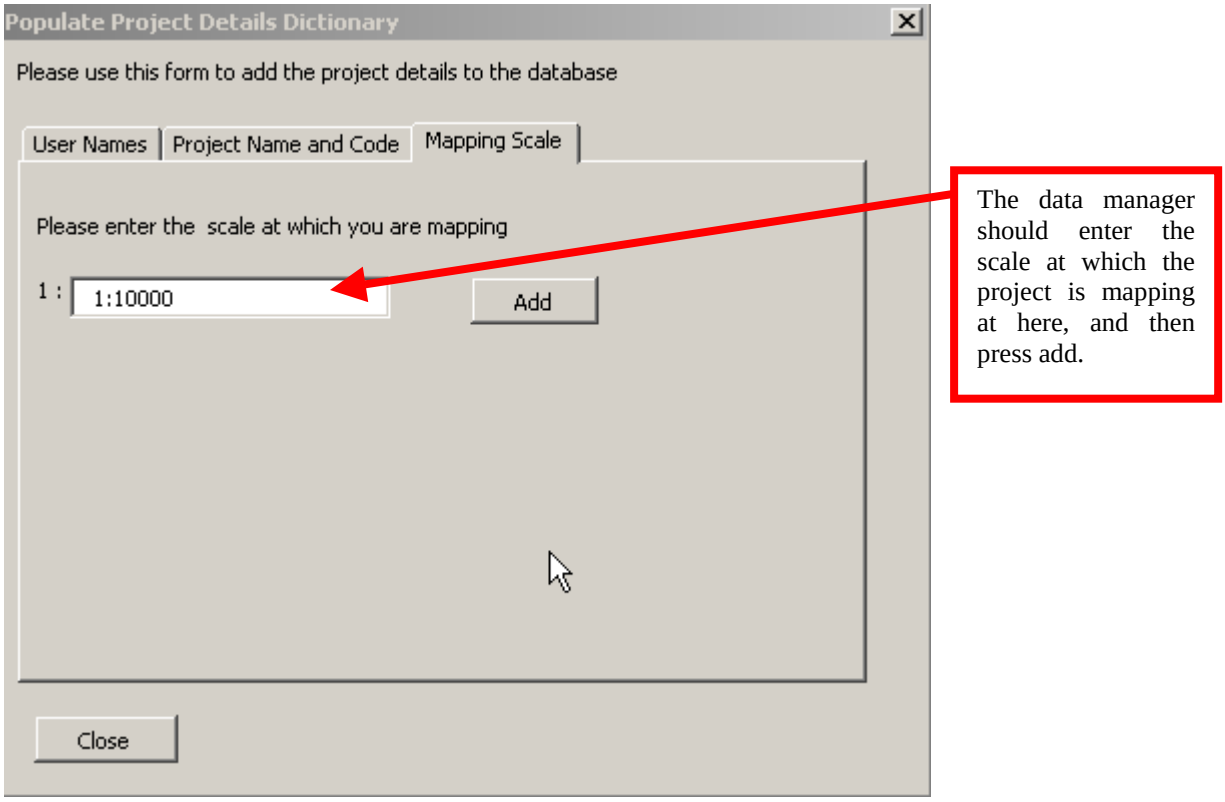
Section 2 – Project name and Code



The form shows the project name and code currently set in the database. The data manger can type over these entries to ensure that the correct project code and name, appear exactly as on the SDE. The data manager has to ensure both text boxes are entered before pressing the “Add” button. It is essential that the data manager does this for the field staff before entering the field so

that the project names and codes are written in exactly the same way on each field staff members MIDAS GIS.

Section 3 – Mapping Scale

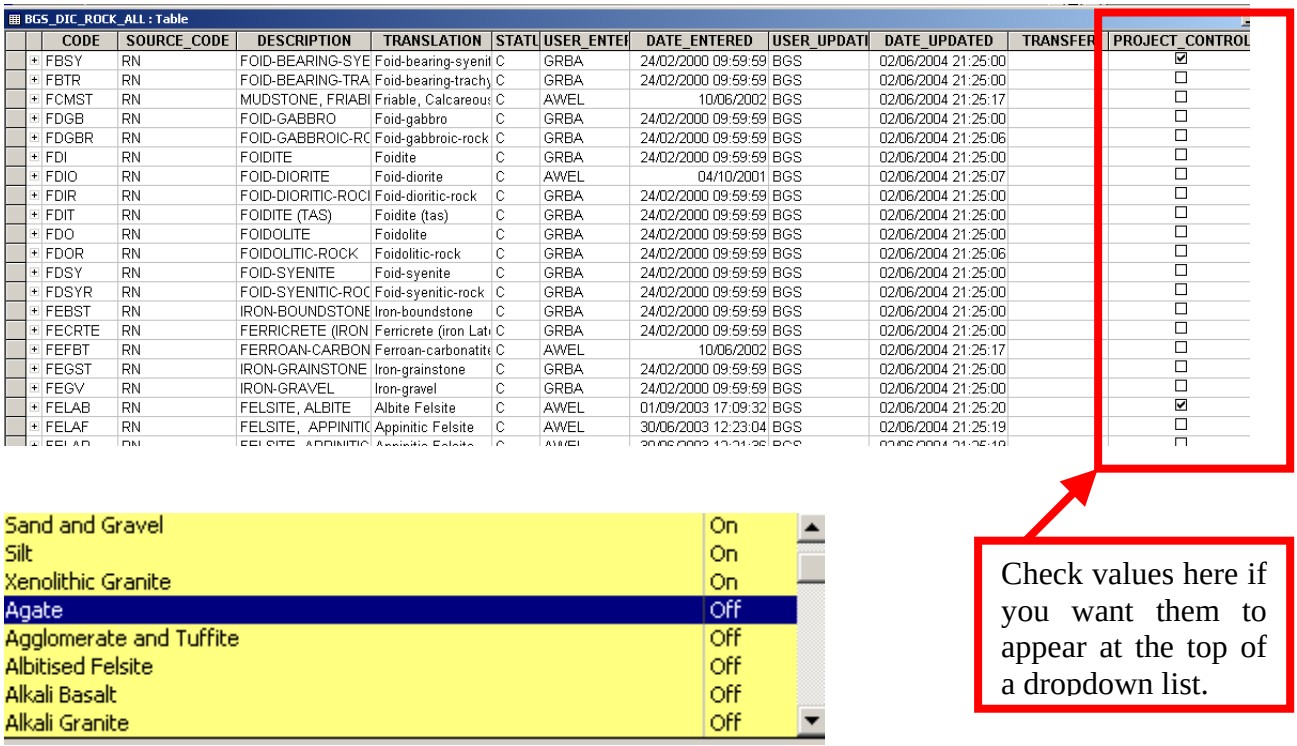


Once these three sections have been populated with information, the user can check that the database is using the correct values by viewing the form that appears after pressing the Project/user details button. All of these details are then stored in the database table USER_DETAILS.

If any of the user names are missing from the list of usernames to add, the data manager must close MIDAS and open up the DFDC.mdb database and Edit the table DIC_META_ORACLE_USER to include the name and user Id of the missing members of the project team.

5.2.2 Setting up project dictionaries

Within the DFDC.mdb there are several dictionary tables. Some of these, such as BGS_DIC_ROCK_ALL are very extensive and would take up a lot of room in dropdown lists in the field. To reduce the time spent searching through lists to find the right value, the dictionaries have been set up with a project control field because different projects map in different domains and will require different values. The data manager can go through each dictionary to check the project control box beside any dictionary value that they feel will be used within the mapping domain. What this does is force these checked dictionary values into alphabetical order at the top of a dropdown list on the Tablet PC. All other values, i.e. with no project control tick, will be included, in alphabetical order, in the dropdown list, but below the checked values.



BGS_DIC_ROCK_ALL : Table

CODE	SOURCE_CODE	DESCRIPTION	TRANSLATION	STATU	USER_ENTEI	DATE_ENTERED	USER_UPDATI	DATE_UPDATED	TRANSFER	PROJECT_CONTROL
FBSY	RN	FOID-BEARING-SYE	Foid-bearing-syenit	C	GRBA	24/02/2000 09:59:59	BGS	02/06/2004 21:25:00		☑
FBTR	RN	FOID-BEARING-TRA	Foid-bearing-trachy	C	GRBA	24/02/2000 09:59:59	BGS	02/06/2004 21:25:00		☐
FCMST	RN	MUDSTONE, FRIABI	Friable, Calcareous	C	AWEL	10/06/2002	BGS	02/06/2004 21:25:17		☐
FDGB	RN	FOID-GABBRO	Foid-gabbro	C	GRBA	24/02/2000 09:59:59	BGS	02/06/2004 21:25:00		☐
FDGBR	RN	FOID-GABBROIC-RC	Foid-gabbroic-rock	C	GRBA	24/02/2000 09:59:59	BGS	02/06/2004 21:25:06		☐
FDI	RN	FOIDITE	Foidite	C	GRBA	24/02/2000 09:59:59	BGS	02/06/2004 21:25:00		☐
FDIO	RN	FOID-DIORITE	Foid-diorite	C	AWEL	04/10/2001	BGS	02/06/2004 21:25:07		☐
FDIR	RN	FOID-DIORITIC-ROCI	Foid-dioritic-rock	C	GRBA	24/02/2000 09:59:59	BGS	02/06/2004 21:25:00		☐
FDIT	RN	FOIDITE (TAS)	Foidite (tas)	C	GRBA	24/02/2000 09:59:59	BGS	02/06/2004 21:25:00		☐
FDO	RN	FOIDOLITE	Foidolite	C	GRBA	24/02/2000 09:59:59	BGS	02/06/2004 21:25:00		☐
FDOR	RN	FOIDOLITIC-ROCK	Foidolitic-rock	C	GRBA	24/02/2000 09:59:59	BGS	02/06/2004 21:25:06		☐
FDSY	RN	FOID-SYENITE	Foid-syenite	C	GRBA	24/02/2000 09:59:59	BGS	02/06/2004 21:25:00		☐
FDSYR	RN	FOID-SYENITIC-ROC	Foid-syenitic-rock	C	GRBA	24/02/2000 09:59:59	BGS	02/06/2004 21:25:00		☐
FEBST	RN	IRON-BOUNDSTONE	Iron-boundstone	C	GRBA	24/02/2000 09:59:59	BGS	02/06/2004 21:25:00		☐
FECRTE	RN	FERRICRETE (IRON	Ferricrete (iron Lat	C	GRBA	24/02/2000 09:59:59	BGS	02/06/2004 21:25:00		☐
FEFBT	RN	FERROAN-CARBON	Ferroan-carbonatite	C	AWEL	10/06/2002	BGS	02/06/2004 21:25:17		☐
FEGST	RN	IRON-GRAINSTONE	Iron-grainstone	C	GRBA	24/02/2000 09:59:59	BGS	02/06/2004 21:25:00		☐
FEGV	RN	IRON-GRAVEL	Iron-gravel	C	GRBA	24/02/2000 09:59:59	BGS	02/06/2004 21:25:00		☐
FELAB	RN	FELSITE, ALBITE	Albite Felsite	C	AWEL	01/09/2003 17:09:32	BGS	02/06/2004 21:25:20		☑
FELAF	RN	FELSITE, APPINITIC	Appinitic Felsite	C	AWEL	30/06/2003 12:23:04	BGS	02/06/2004 21:25:19		☐

Sand and Gravel	On
Silt	On
Xenolithic Granite	On
Agate	Off
Agglomerate and Tuffite	Off
Albitised Felsite	Off
Alkali Basalt	Off
Alkali Granite	Off

Check values here if you want them to appear at the top of a dropdown list.

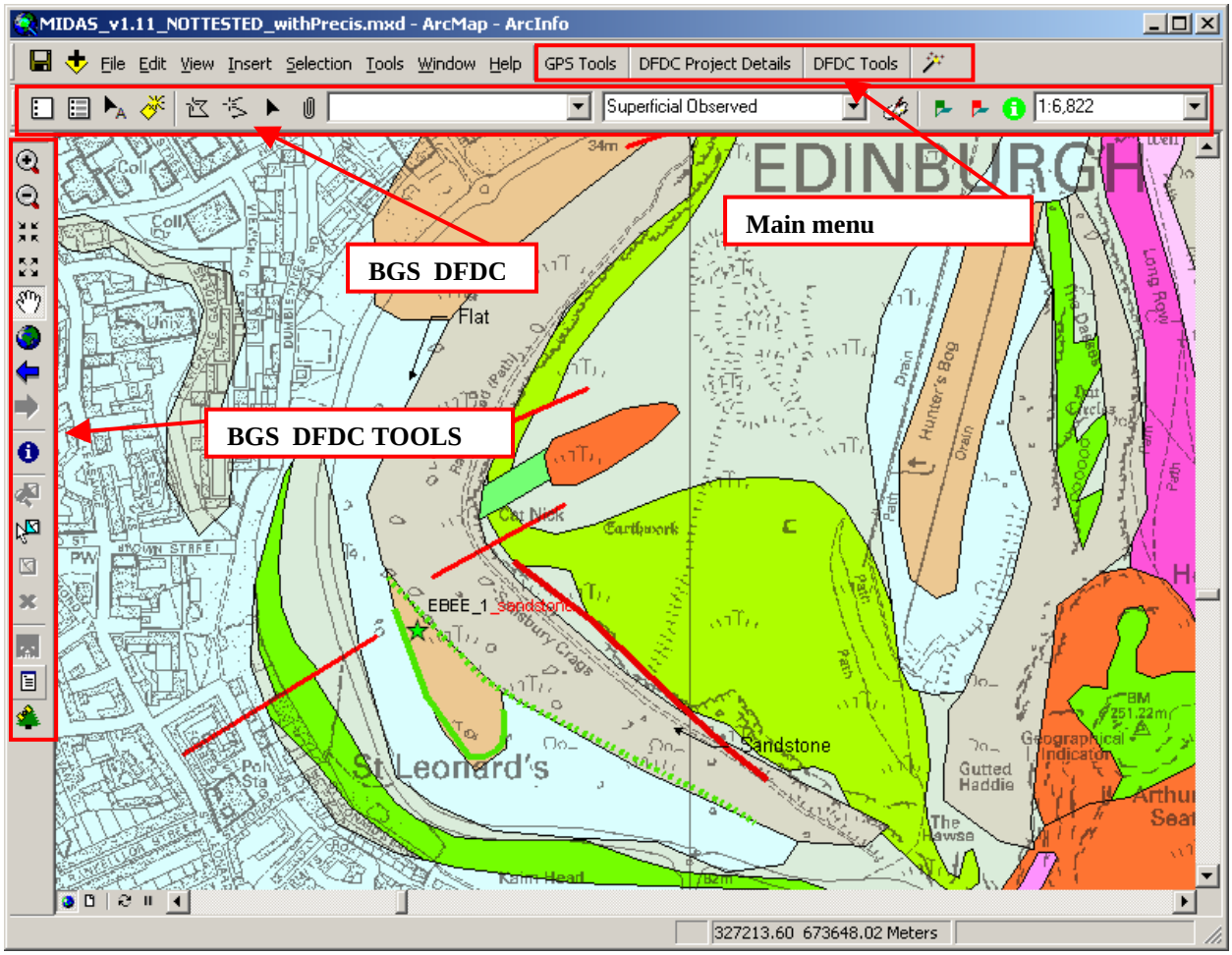
This means that all dictionary values will be available in the field, but only some will be listed at the top of the dropdown list

5.2.3 Transferring to the Tablet PC

Once MIDAS has been set up to hold all project data and project dictionaries, the individual user can copy and paste the MIDAS folder onto the tablet PC. This can be done either through the network if connected, or through a USB data stick. When the MIDAS GIS is on the tablet PC, the user should rename the MIDAS_project.mxd to include their username as a suffix. This will be useful when storing each team members MIDAS.mxd on a shared space.

If you are using MIDAS for the first time on the tablet, you will first need to open the DFDC.mdb in Access 2003 and select Tools > Macro > Security and set the security level to low. This ensures that macros built in the system will work when fired up from ArcGIS. This may have been done for you, but it is important that you check this.

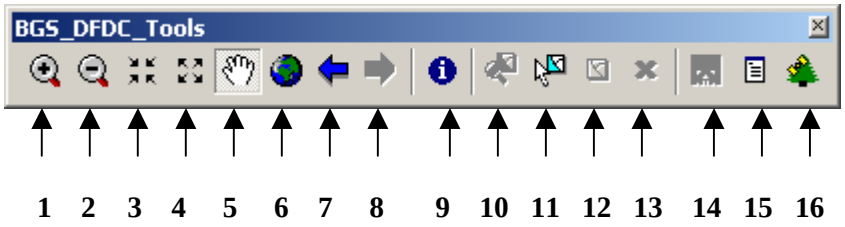
5.3 THE MIDAS GRAPHICAL USER INTERFACE (GUI)



The layout of the MIDAS application is shown above. Five toolbars have been developed for DFDC incorporating the tools that are required in the field. Three of these are outlined below. The other two are the DFDC_GPS toolbar and the structure contour tool, both of which are detailed later.

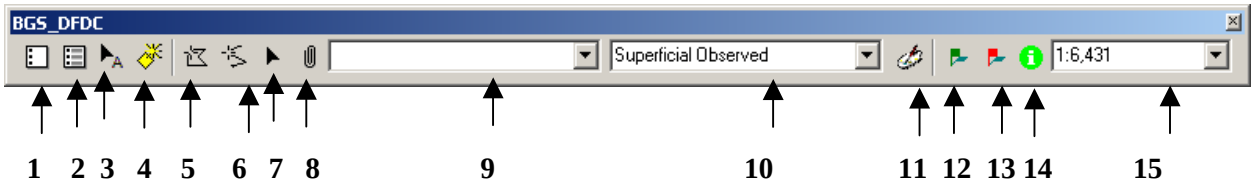
5.3.1.1 BGS DFDC TOOLS

This toolbar uses a subset of useful tools that appear on the default ESRI tools toolbar as well as customised DFDC tools developed in BGS. Each tool is outlined below but their best practice use is described in more detail later in this document.



1. ***Zoom in***
2. ***Zoom out***
3. ***Fixed zoom in*** - Zooms in to the centre of the map in steps.
4. ***Fixed zoom out*** - Zooms out of the centre of the map in steps.
5. ***Pan*** - Lets the user move the map centre
6. ***Full Extent*** - Zooms to the full extent of all the data.
7. ***Go back to previous extent***
8. ***Go to next extent***
9. ***Identify*** - brings up the attributes of a feature.
10. ***Zoom to selected features***
11. ***Select features*** - Selects map features that are set as selectable.
12. ***Clear selected features*** (unselect the selected features)
13. ***Delete selected geofeatures*** – deletes those selected GeoPolygons, GeoLines, Map Face Notes or Field Observation Points.
14. ***Finish Sketch*** –If you are creating a GeoLine or GeoPoly feature and find it difficult to double tap on the tablet to finish drawing, press this button instead and it will finish drawing for you.
15. ***Toggle table of contents*** - Toggle this on or off depending on whether you want to view the table of contents window (TOC) or not.
16. ***Toggle DFDC GPS toolbar*** - Toggle this on or off depending on whether you want to view the DFDC_GPS toolbar or not.

5.3.1.2 BGS_DFDC



1. ***Add Map Face Note*** - This tool enables the user to enter a map face comment to the digital field slip.

2. ***Edit Map Face Note*** - This tool enables the user to edit the content of an existing map face comment.

3. ***Move Map Face Note Tool*** - This tool allows the user to move the position of a map face comment.

4. ***Copy map face note*** - The user can use this tool to copy a selected mapface note to save them time re-writing it.

5. ***Draw GeoPoly*** - The user can use this tool to draw a polygon on the field slip. They can select the colour and the shading of the polygon by changing the selections available in the dropdown lists 8 & 9. The project leader must decide what combination of fill style and colour correspond to each type of feature being mapped. This will vary depending upon mapping domain and as such project specific.

6. ***Draw GeoLine*** - The user can use this tool to draw a line on the field slip. They can select the linestyle by changing the dropdown selection shown in 9.

7. ***Edit Tool*** - This allows the user to edit the shape of a GeoPoly or GeoLine by moving the shapes vertices.

8. ***Label a geofeature*** - When a geofeature (GeoPoly or GeoLine) has been selected, the user can use this tool to label it if they so wish. To display these labels on the Map Face, select button 10e.

9. ***Colour combo box for GeoPoly*** - See point 5 above.

10. ***Type Combo box for GeoLine*** - See points 5 and 6 above.

11. ***Change geoline or geopoly symbology*** - This button allows the user to amend the symbology of a selected geofeature. The symbology is updated to reflect what is visible in the combo boxes (buttons 9 and 10).

12. ***Add Notebook observation point*** - This button allows the user to add a point to the map face. Once the point is added the notebook application opens.

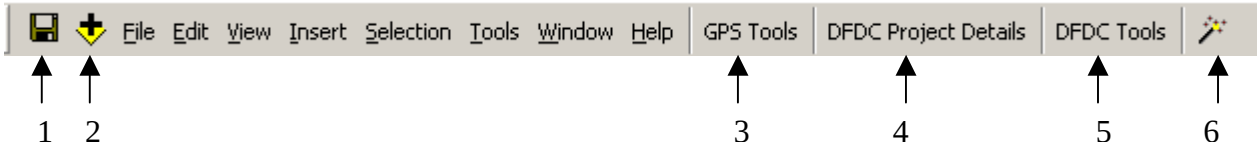
13. ***Edit Notebook observation point*** – This button allows the user to edit an existing notebook point on the map face. Once the point is selected the notebook application opens.

14. ***Precis tool*** - Use this tool to identify on a field observation point and view all the data entered at that point in a précis list within ArcMap. It is also possible to view photographs and sketches taken at the point being identified.

15. ***Map scale*** - This combo box shows the current map scale. A new scale can be entered here and the map will zoom to the new scale.

5.3.1.3 MAIN MENU

The main menu toolbar includes all menus found in any new ArcMap document, and some addition menus to use within MIDAS.

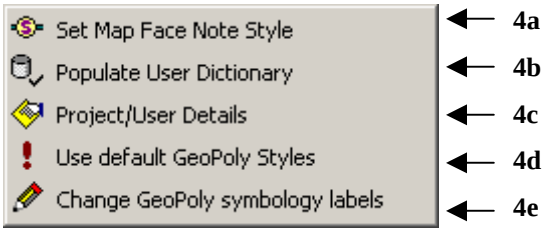


1. ***Save*** - Saves the project

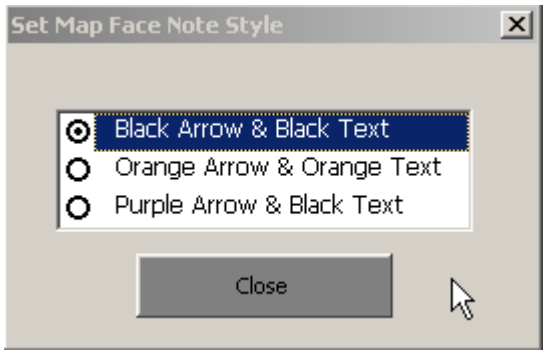
2. ***Add layer*** - lets the user browse to add a new layer into the GIS.

3. ***GPS tools*** - Lists all the GPS tools that are also found on the GPS toolbar.

4. ***DFDC project details*** - menu of project/person specific buttons which change default settings.



4a. ***Set map face note style*** – Use this to change the colour of the text and arrow of future map face note. Each time the project opens, the default is reset to a black arrow and black text. There is a choice of three styles.



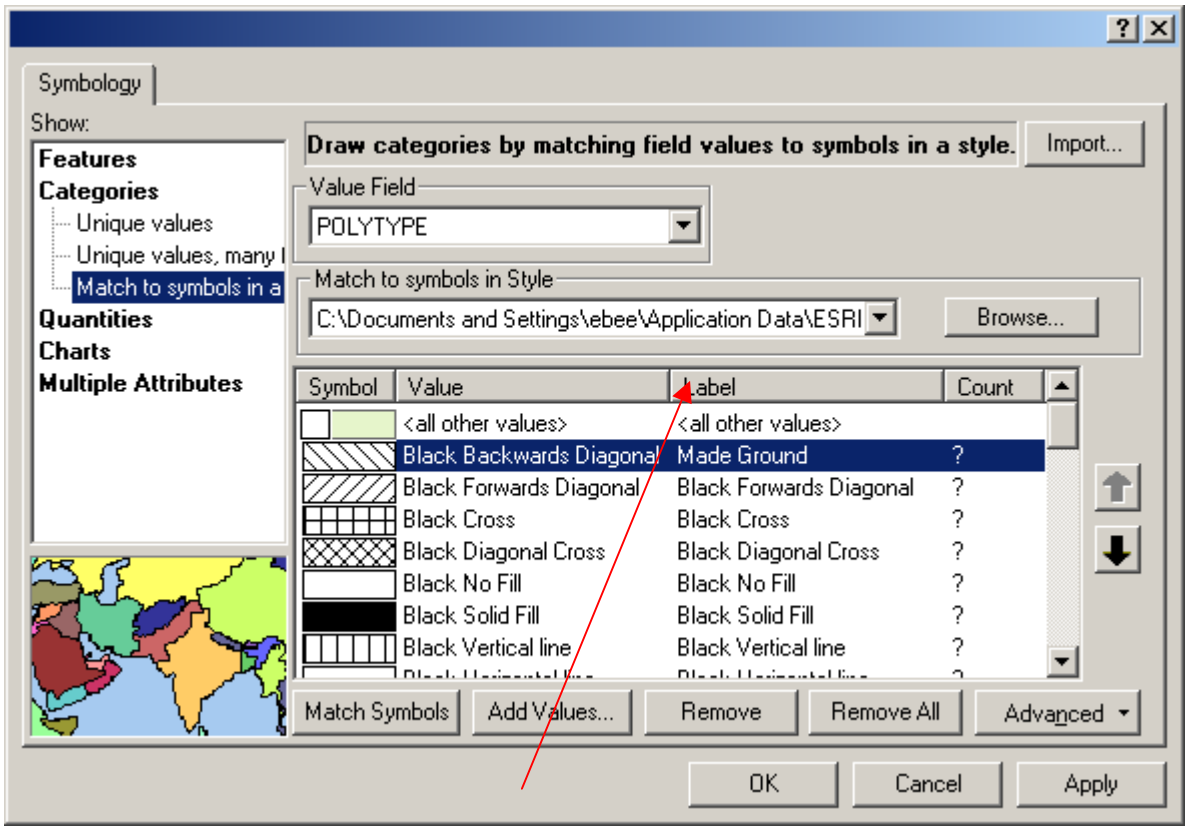
4b. ***Populate User dictionary*** - This button opens a form in which the user can change the default project details. This should be done by the data manager before going into the field, but in case it isn't, a user can populate the project details here. See section 4.2.1.

4c. ***Project/User details*** - This button displays the default project name and user details that have been entered into the database. Press this to change the user name, or check to see the details are correct. It is the same form as the one which pops up when the MIDAS application is opened.

4d. Use default GeoPoly styles - By pressing this button, the default fill types and label text for the GeoPoly layer are applied. This removes any project specific customisation of value labels which may have been applied (see 4e).

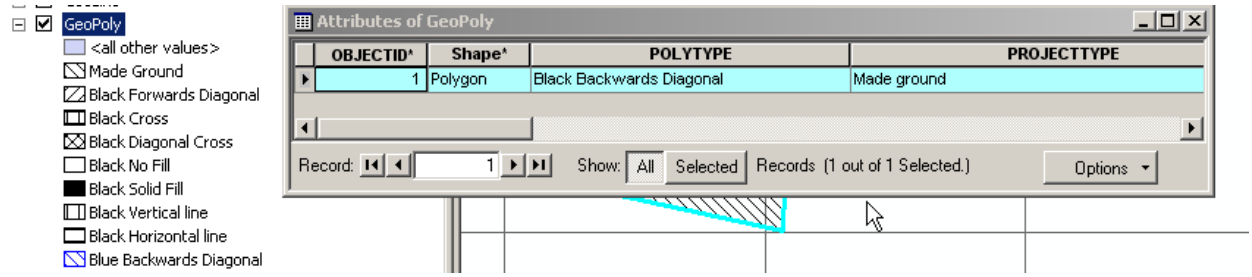
4e. Change Geopoly symbology labels - This button brings up the symbology window of the GeoPoly layer. A user can enter an alternative label for each polygon fill type into the label section if they so wish. The application colours GeoPolygons up based on the value field rather than the label field. The value field therefore, must not be altered. The value fields are also used

to construct the drop-down menu boxes for polygon fill-type, so it is important to note that even though you may change the label field, the dropdown menus will not change.

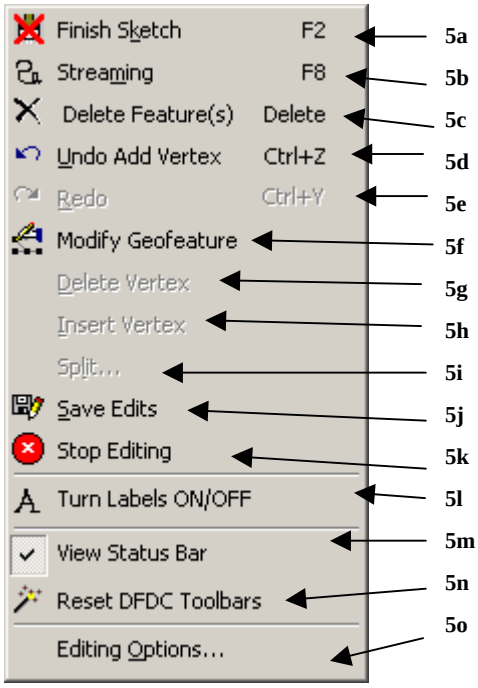


User changes symbology label here

Both the Value text and the label text are stored within the attribute table of the GeoPoly. This is to ensure that project specific fill types can be retrieved with their true meaning at a later date.



5. ***DFDC tools***, d***rop down list of tools –*** see list of buttons 5a – 5k below.



5a. ***Finish Sketch*** – If you are creating a GeoLine or GeoPoly feature and find it difficult to double tap on the tablet to finish drawing, press this button instead and it will finish drawing for you.

5b. ***Turn on/off streaming*** - Streaming adds vertices as your pointer moves around the screen whilst in editing mode. If you prefer to tap to add each vertices, turn this off, else turn it on for streaming. You can set streaming preferences using the editing options button described in 10j and detailed in section 4.4.5.

5c. ***Delete Features*** - This button allows the user to delete selected features.

5d. ***Undo*** - This button undoes the last action.

5e. ***Redo*** - This button redoes the previously Undone last action.

5f. ***Modify Geofeature*** - When a GeoLine of GeoPoly is selected, the user can select this tool to automatically start modifying the look of the feature.

5g. ***Delete Vertex*** - ESRI editing tool that is also accessible by a right click, this option lets the user delete a vertex on a polygon.

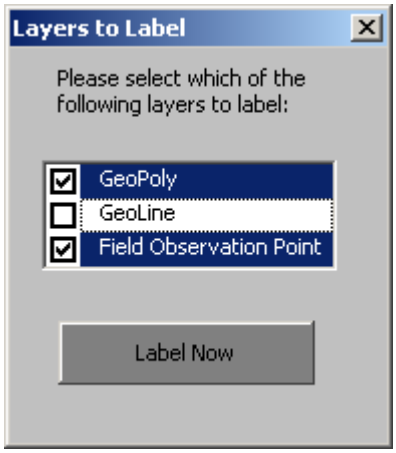
5h. ***Insert Vertex*** – ESRI editing tool that is also accessible by a right click, this option lets the user insert a vertex to a polygon.

5i. ***Split*** - ESRI editing tool. This allows the user to split a geoline into two given a specified length.

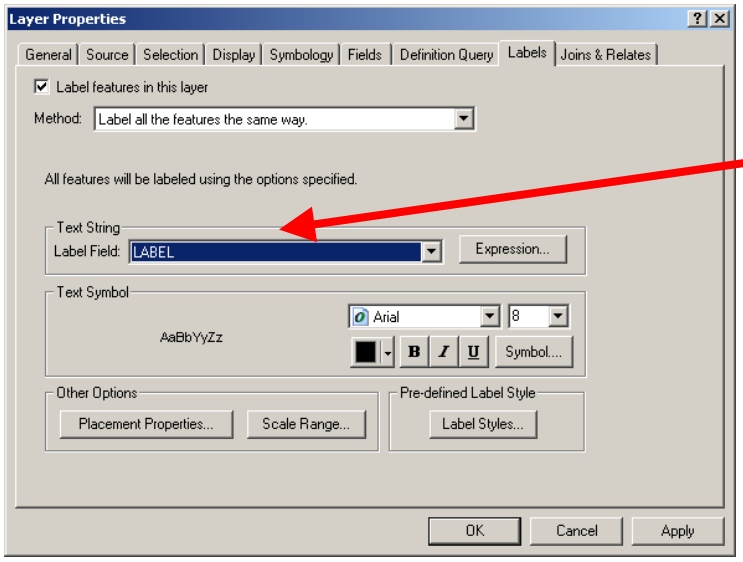
5j. ***Save Edits*** - This button allows the user to save any edits without having to stop editing. It is a useful tool to use if the user is making a lot of changes within an editing session.

5k. ***Stop Editing*** - This button forces the user to stop the edit session. If you have created a feature, it will ask you whether you wish to save your edits.

5l. ***Turn labels on/off*** – If you have entered any labels for the GeoLine or GeoPolys, or want to view the notebook point labels, you can turn labelling on or off here.



Select the layers you wish to view labels. To add a label to a GeoLine or GeoPoly feature, use button 7 above and turn on the layers labelling option here.



If a layer's labels do not appear to correspond to the correct attribute field, right click on the layer to bring up its properties, go to the labels tab and check that the label field is set to LABEL as shown here.

5m. ***Toggles status bar*** - This button toggles on and off the status bar to create more room on the tablet to view the field slip. The status bar holds information about location and tool messages.

5n. ***Reset DFDC Toolbars*** - If there are several toolbars displayed in the GIS, press this button to hide all of those except for the MIDAS toolbars.

5o. ***Editing Options*** - This button brings up the editing options form. Settings such as streaming tolerance can be adjusted for user preference here.

6 ***Reset DFDC Toolbars*** - If there are several toolbars displayed in the GIS, press this button to hide all of those except for the MIDAS toolbars.

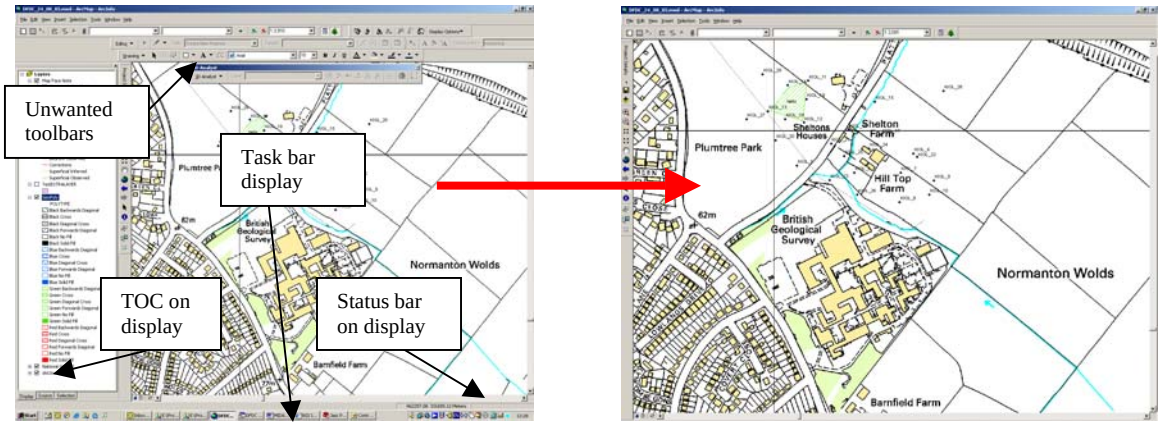
5.3.2 Maximising the map display (data view)

In order to maximise the available screen space on the tablet PCs for viewing the digital field slip, a number of buttons have been created within the MIDAS GIS for the user to use as and when required.

- The user can turn off viewing the table of contents by clicking this button (DFDC_Tools button1).
- The status bar can be turned off by clicking this button View Status Bar (main menu button 5h).

- The toolbars can be reset by clicking this button 

(main menu button 5i or 6)
- Finally, the tablets can be set up so that the task bar in Windows is set to auto hide, again creating more space in ArcMap. This is done by right clicking on the task bar, selecting properties and checking auto-hide.



Wasteful use of screen space **Optimal use of screen space**

5.4 USING THE DIGITAL FIELD SLIP

Field mapping can consist of the following types of data recording:

- Pro-forma based recording - structured data which are commonly dictionary constrained.
- Notebook based recording - freeform recording of detailed comments and sketches (e.g The Red Notebook).
- Map based recording – brief text notes on the map face, geological lines and landforms (e.g. The field slip).

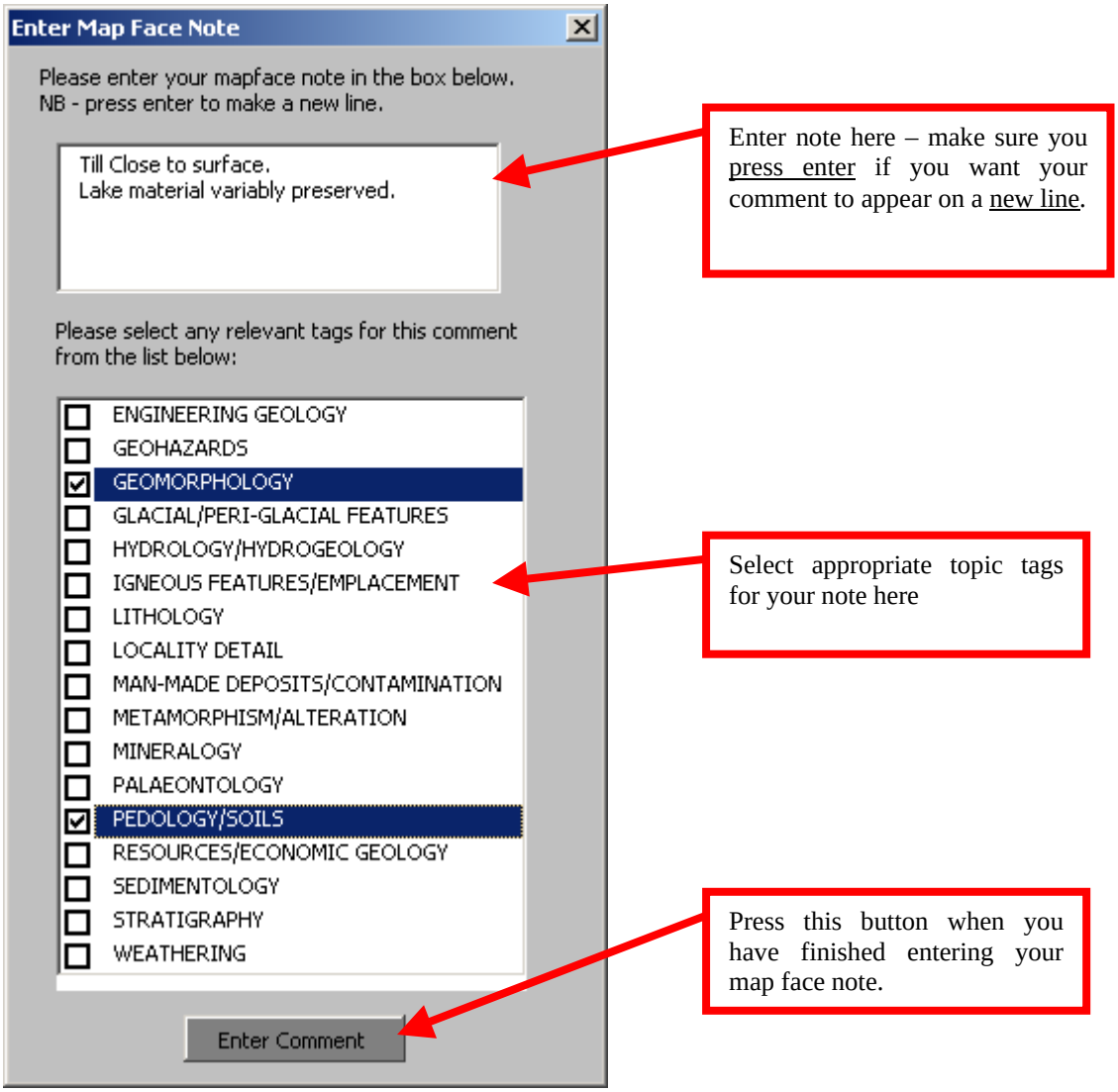
MIDAS has incorporated all of these types of recording into a digital environment. The GIS map acts as the field slip for map based recording of geological line work, landforms and brief text notes. Points that require further detailed comments or structured based recording can be marked on this digital map and expanded upon through the digital notebook.

5.4.1 The Map Face Note

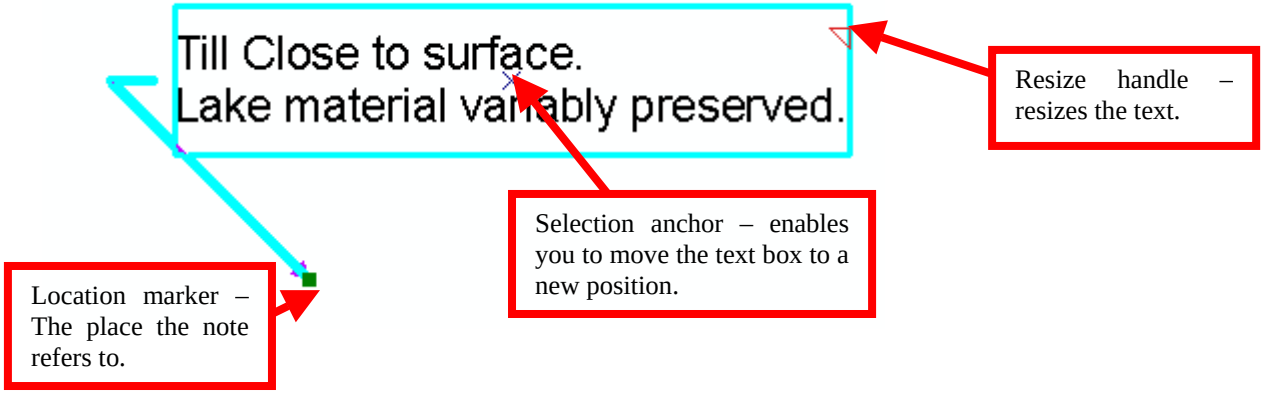
The map face note is designed to replicate the traditional brief comments geologists make on their field slips. These are notes that are viewed on the map whilst conducting fieldwork.

To add a map face note to the GIS, click the “Add Map face Note” tool  and then click on the screen to indicate where your Map Face Note will refer to. There are two clicks involved, the first positions the arrowhead, the second positions the end of the arrow and the start of the text. Once positioned, a menu will appear in which you can add your note and tag your note with a topic to which it refers. More than one topic can be entered.

Simply hover the stylus over the box where the notes are to be added and a tool will appear for you to click on before the handwriting interface appears. This will be explained in more detail, and there will be time to practice during the two day course that accompanies these notes.



The map face note will now appear in ArcMap. It can be moved around or resized using the edit annotation button .

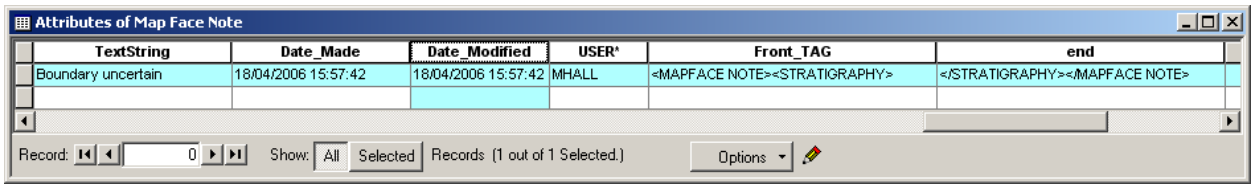


To edit a note you have created you must first select the annotation feature you wish to edit, then press the edit Map Face Note button . This will pop up the same form as before, but this time the tags and comments you had entered will be displayed. Change the tags or note if you wish and press save edits. The edit annotation button is automatically turn on so that you can now move the annotation if you wish.

When annotation is created or edited, MIDAS stores the username and the date automatically in the annotation attribute fields. The note itself is also stored here. The size of the annotation is set so that it can be viewed and read at the quarter sheet level for 1:10,000 mapping – the size of a normal field slip. The text therefore may appear quite large if you are zoomed far in, or too small if zoomed to far out.

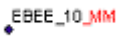
When creating map face notes, it is important to bear in mind that the enter key must be pressed if you want to create a new line within the text. This is true on the tablets even if the hand writing recognition text appears on a new line.

The following QA attributes are stored within the Map face note attribute field:



5.4.2 The Notebook point observation

Notebook points can be added to the digital field slip when more detailed or structured information is required about a certain point. There are two buttons which access the digital notebook these are:  . The green flag allows the user to add a notebook point, whereas the red flag allows a user to edit an existing notebook point. Notebook points are labelled on the map face with the username and a consecutive number so that the geologist can reference it at any other point. It is also possible to add a summary label in to the digital notebook to summarise the notebook entry if required. For example, if the lithology is Mercia Mudstone then the geologist may wish to write the summary label MM. The method in which you would create this summary label will be outlined in section 4.5. These summary labels are shown in red as indicated below. To view these in the GIS, the map must have been refreshed and the layer label option should be turned on.



It is important to be patient with the system when adding or editing a field observation. It takes a small amount of time for the code to be generated to open Access from within ArcMap and transfer and build the relevant forms for data entry. Section 4.5 will explain, in more detail, the digital notebook itself.

If you wish to delete a notebook feature then you have to ensure you are editing the layer, have selected the feature and pressed delete. If you do this, please note that the database has been set to cascading so any associated notes in the database will also be deleted. You can use the "Undo" button (5d) to restore i.e. undelete the data.

If you move a notebook feature then you must ensure that the X and Y field values are correct. ArcMap stores the location of a point internally within its geometry rather than in the attribute table. This means that you can have X and Y values in an attribute table that are not actually the true position of the point. If you want to update the attribute table with the correct X and Y values whilst in the ArcMap session the user will need to grab the shape.x and shape.y in calculate values as described below – alternastively shut down ArcMap and re-open it.

1. Click Editor on the Editor toolbar and click Start Editing (you'll need to view the editor toolbar through the view menu).

2. You can make calculations without being in an editing session; however, in that case, there is no way to undo the results.

3. Right-click the Field observation point layer and click Open Attribute Table.

4. Right-click the field heading for the X field (Easting) and click Calculate Values.

5. Click Calculate Values.

6. Check Advanced.

7. Type the following VBA statement in the first text box:

```
Dim dblX As Double

Dim pPoint As IPoint

Set pPoint = [Shape]

dblX = pPoint.X
```

8. Type the variable dblX in the text box directly under the X field name.

9. Click OK.

10. Right-click the field heading for the Y field (Northing) and click Calculate Values.

11. Click Calculate Values.

12. Check Advanced.

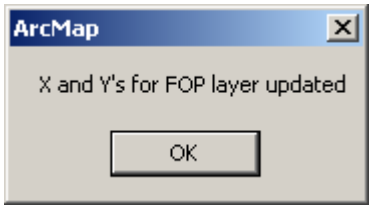
13. Type the following VBA statement in the first text box:

```
Dim dblY As Double

Dim pPoint As IPoint

Set pPoint = [Shape]

dblY = pPoint.Y
```

14. Type the variable dblY in the text box directly under the Y field name.

15. Click OK.

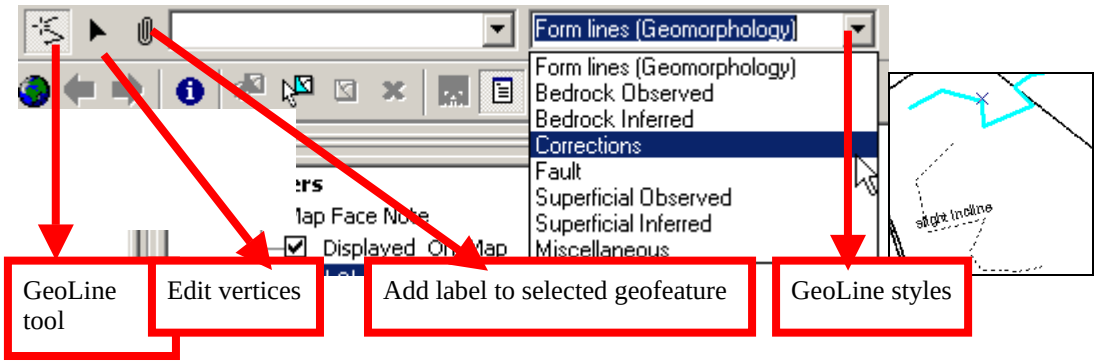
ArcMap has been customised so that once it shuts down, all X and Y attribute values are updated in case any feature has been moved within the session. The following message box will appear to confirm this.



5.4.3 The GeoLine Tool

The GeoLine tool has been designed to mark geological linework onto the digital field slip. The user can select the tool, select the line style from the drop down list and draw the line. Streaming

can be turned on or off (see editing options section) and vertices can be removed using the edit vertices tool.

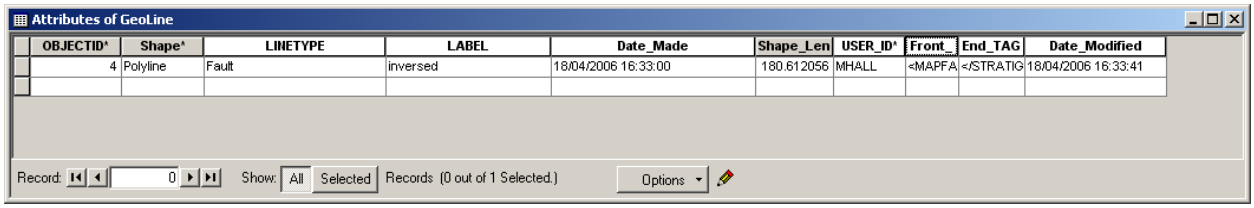


If a geoline has been drawn using the wrong style, select the feature, alter the value in the combo box to display the correct value and then press the palette tool button  to change the symbology of the feature.

To add a label to a GeoLine feature, make sure it is selected and press the  button. A comments form with tags will be shown. This form is the same as the add map face note form except the size of label is limited to 50 characters. This means you can tag the label with a topic if required. To view the labels, make sure that the GeoLine layer labelling is set to on using the turn labels on and off button (5g).

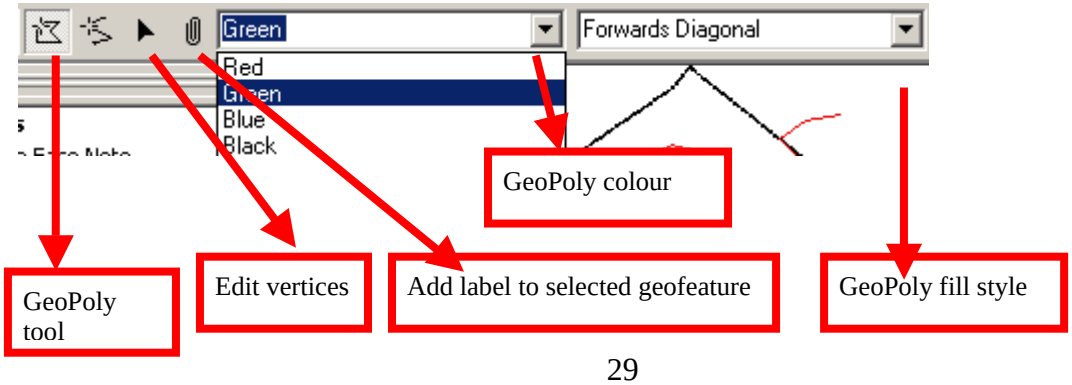
GeoLines, which are your draft field lines, will need to be digitally inked in within the GSD. It is not always possible to determine the geology or geomorphology in the field until several observations with linework have been made. Several GeoLines created in the field may determine just one feature (polygon or line) in the GSD. Hence the need to digitally ink in the data within the GSD. This will also help maintain and differentiate field observations and interpretations from those made in the office.

The attribute table for the GeoLine is shown below.



5.4.4 The GeoPoly Tool

The GeoPoly tool has been designed to delineate and draw aerial features onto the digital field slip. The user can select the tool, select the colour and fill style (these should be assigned meaning in each project depending on mapping domain) from the drop down lists, and draw the polygon. Streaming can be turned on or off (see editing options section) and vertices can be removed using the edit vertices tool.

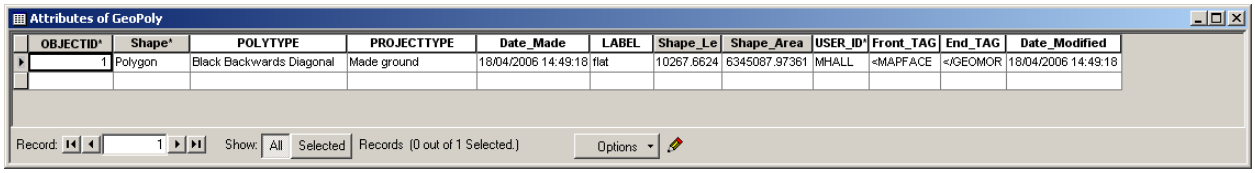


If a GeoPolyon has been drawn using the wrong style, select the feature, alter the value in the combo boxes to display the correct value and then press the palette tool button to change the symbology of the feature.

To add a label to the GeoPolygon, make sure it is selected and and press the button. A comments form with tags will be shown. This form is the same as the add map face note form except the size of label is limited to 50 characters. This means you can tag the label with a topic if required. To view the labels, make sure that the GeoLine layer labelling is set to on using the turn labels on and off button (5g).

GeoPolygons will need to be digitally inked in within the GSD where they are properly attributed. Any structured landform measurements can be made by adding a field observation in the GeoPolygon and entering information through the notebook.

The geopoly attribute table is shown below:

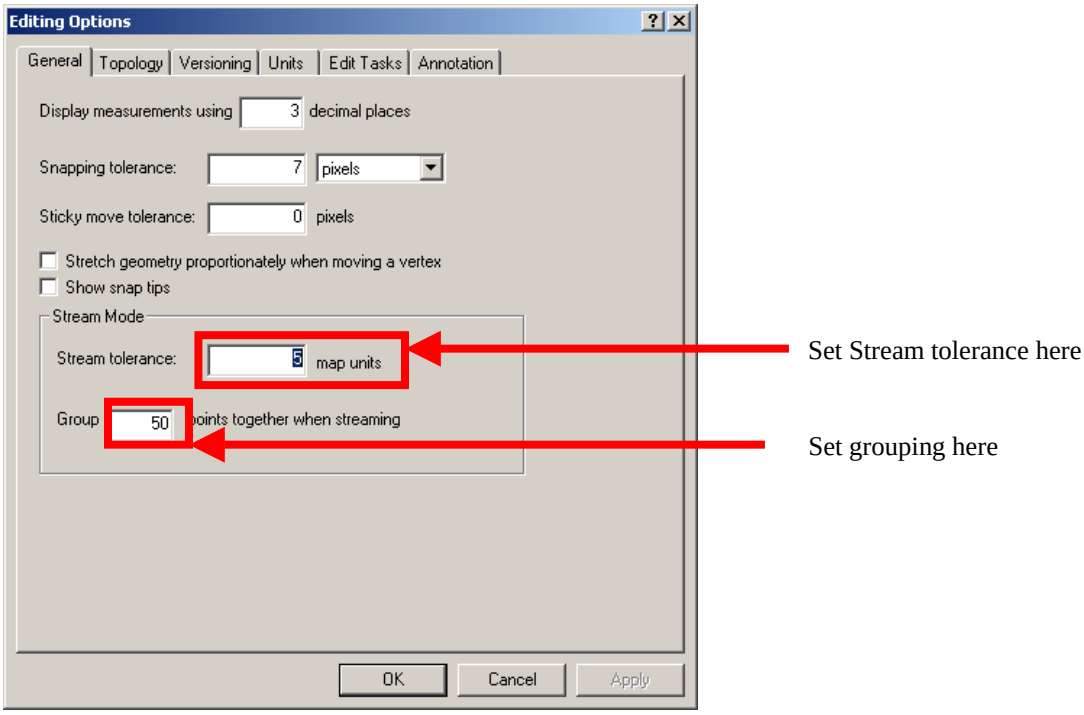


5.4.5 Editing Options (stream or point mode)

GeoLine or GeoPoly Features can be created in two ways; point mode or stream mode (streaming). You can switch back and forth between the two modes as you digitise by pressing the streaming button Streaming (main menu button5b). If you are using a duo-touch Go Book, you are advised to set the screen to touch mode when streaming. The modes can be switched by pressing the hardware buttons 2 and 3 together.

When you start creating a feature on the screen, the default mode is point mode. This enables the user to create a feature on the map using a series of points. The user taps on the screen to create a new point.

Stream mode capture lets the user capture features by allowing ArcMap to automatically add vertices at an interval specified in the stream tolerance section of the editing options. The default stream tolerance is normally zero, although in MIDAS it has been set to five. Each user must enter a tolerance value that suits their requirements. If the tolerance is set to zero, the vertices will join together or overlap each other. The stream tolerance can be changed at any time, even when in the process of creating a feature. The user should adjust these options to their own preferences using the dialogue below, available via the Editing Options Tool (5o).



The user can also define the number of streaming vertices that they would like to group together. This number tells ArcMap how many vertices to delete when the Undo button is clicked (button 10d). For example, if this number is set to 50 the Undo button is clicked whilst the feature is being created, ArcMap deletes the last 50 digitized vertices from the feature. This value is set to 10 as default in the MIDAS GIS.

Sticky move tolerance can also be set here – this determines the minimum number of pixels the pointer must move on the screen before a selected feature is moved. This reduces the risk of moving a feature by accident.

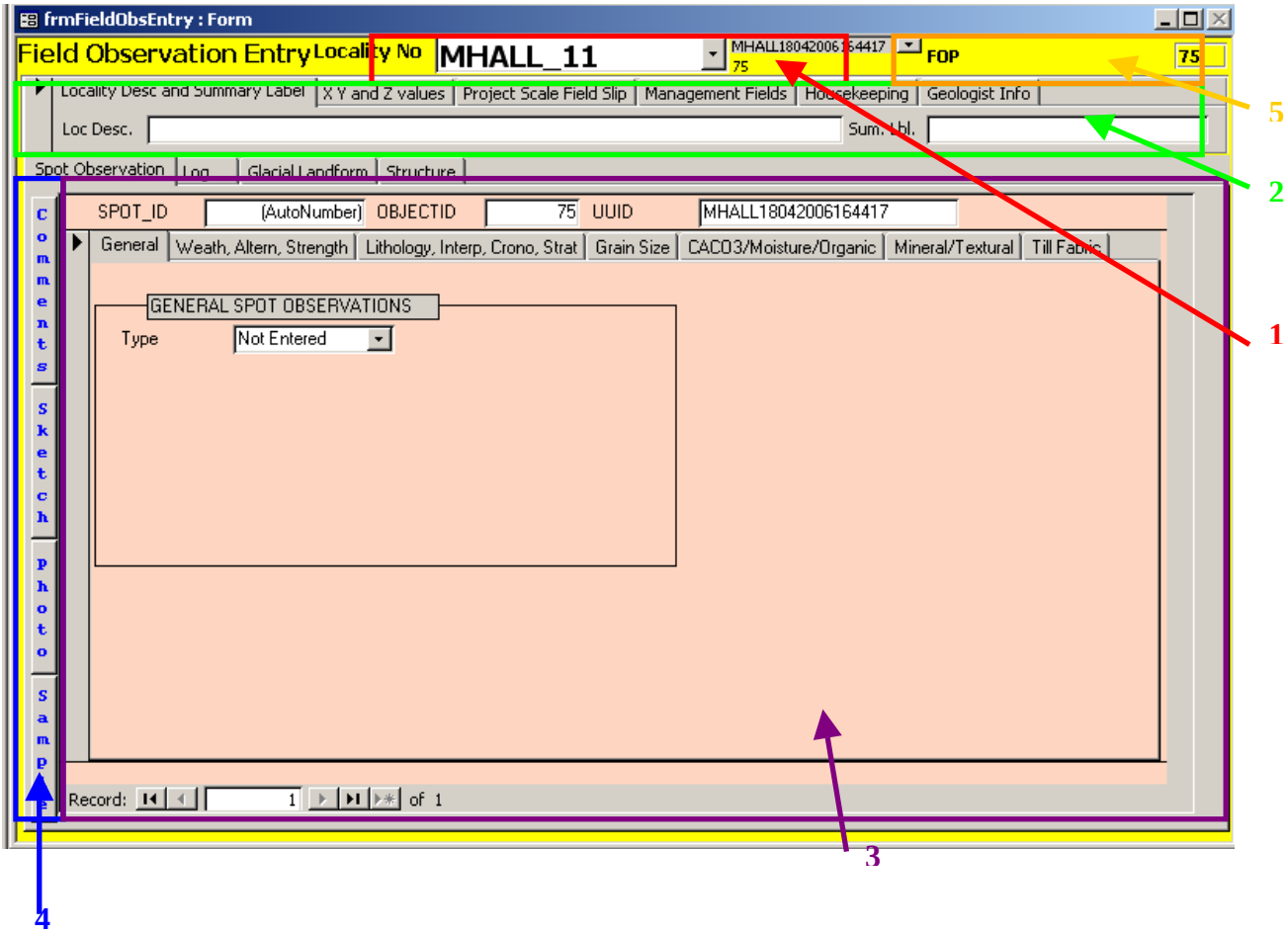
Other ESRI specific editing tools, such as inserting vertices, have been incorporated into the DFDCTools drop down list. Many of these can be accessed by right-clicking, however, as some users dislike right-clicking on a tablet PC, these tools have been included in the drop down list as well.

5.5 CAPTURING STRUCTURED DATA OR MORE DETAILED OBSERVATIONS

Structured information is recorded in a set of related tables in Microsoft Access. A Microsoft Access database can hold 20GB of information. Once this limit is reached, it will not store any more. Bare in mind that 20GB is larger than BoGe. There may be a loss in speed the more data is in the database – but this has yet to be discovered with the MIDAS system.

5.5.1 Layout of the notebook

The notebook application is designed to fit a 12.5cm by 17cm screen in landscape format. It is accessible via the add notebook point button or the edit notebook point button in ArcMap.



1 – Creation of UUID and site label to be displayed on GIS. This is done automatically.

2 – Top level information. Much of this is populated automatically. This is detailed below.

3 – Module display for field entry

4 –Buttons to add comments, sketches, photos or samples at any point in application.

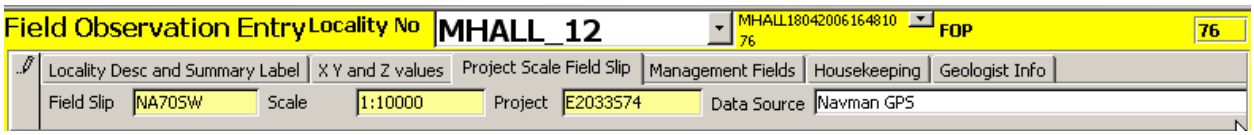
The user can tell where in the system they are from this message. FOP means you are at the top Field Observation Point level, FOP_SPOT_LITH_2 would tell you that you were in Spot, lithology number 2. The sketch, sample, photo and comment areas rely on knowing where in the notebook they were activated. So if a sketch were now drawn in FOP_SPOT_LITH_2, it would know it was a sketch relating to Spot, lithology number 2. This is detailed further in section 4.5.7.

5.5.2 Top level information

Enter location description information here and, if you wish, a summary label to summarise the notebook entry so it can be viewed on the field slip in red ink as described in section 4.4.2

Displays the easting and northing of the notebook point you added or are editing. This is generated by ArcMap. A note of caution – if you move a point in ArcMap then you need to make sure the X and Y values in the attribute table reflect the new location of the geometry as described earlier. If you don't feel confident doing this, then ask a GIS member of staff to do this for you when you return to the office if you have in fact moved a point.

Enter the Z value if known and how you obtained this Z value in the Z source text box in this section. The Z source may be DGPS, DTM (NEXTMAP), DTM (OTHER). This will be a dropdown list in future releases.



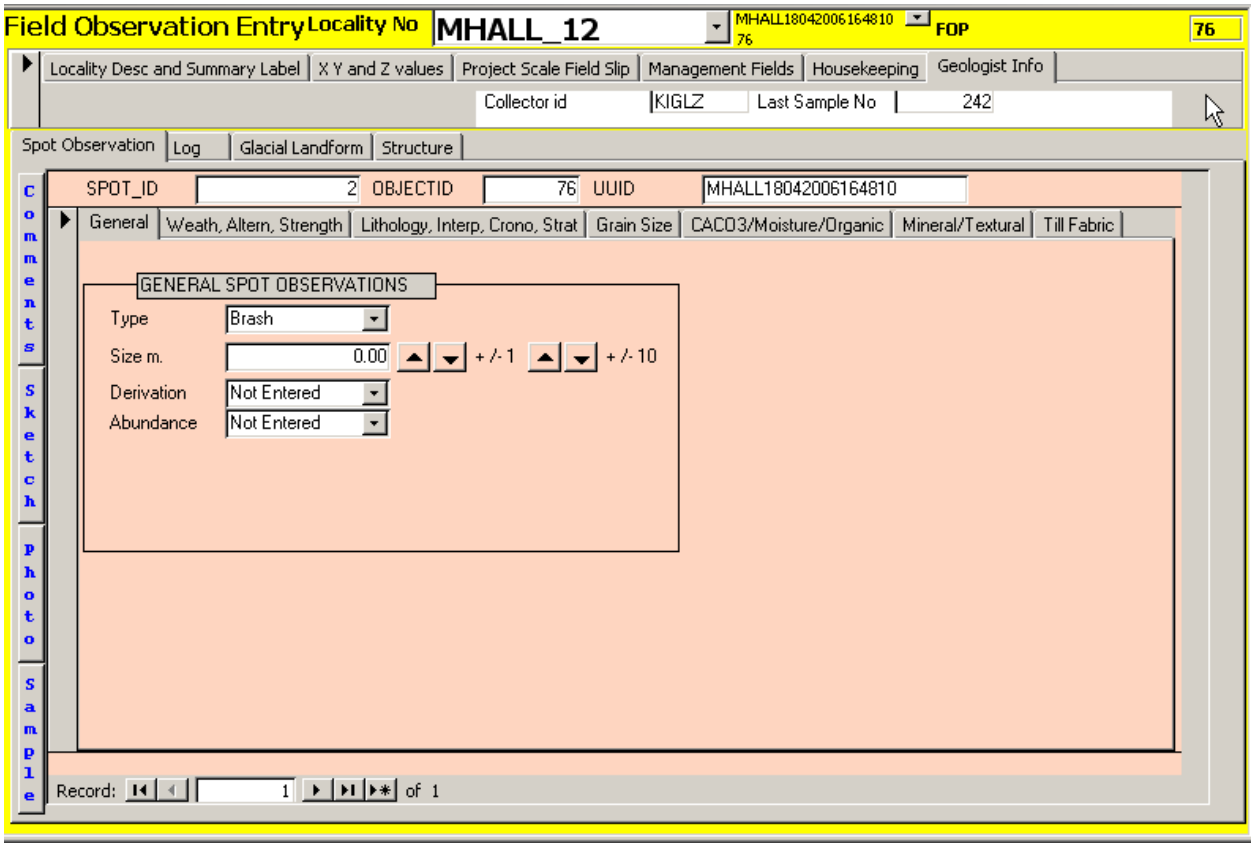
These values were all entered within the GIS. You cannot edit them here, just view them. Enter more information about the XY or Z data source type here if you wish.

Management fields to confirm the date and geologist code are correct. Again you cannot edit these. PFO stands for Primary Field Observation. All data collected in the field will have this value. In the GSD, you may have other types of principal source.

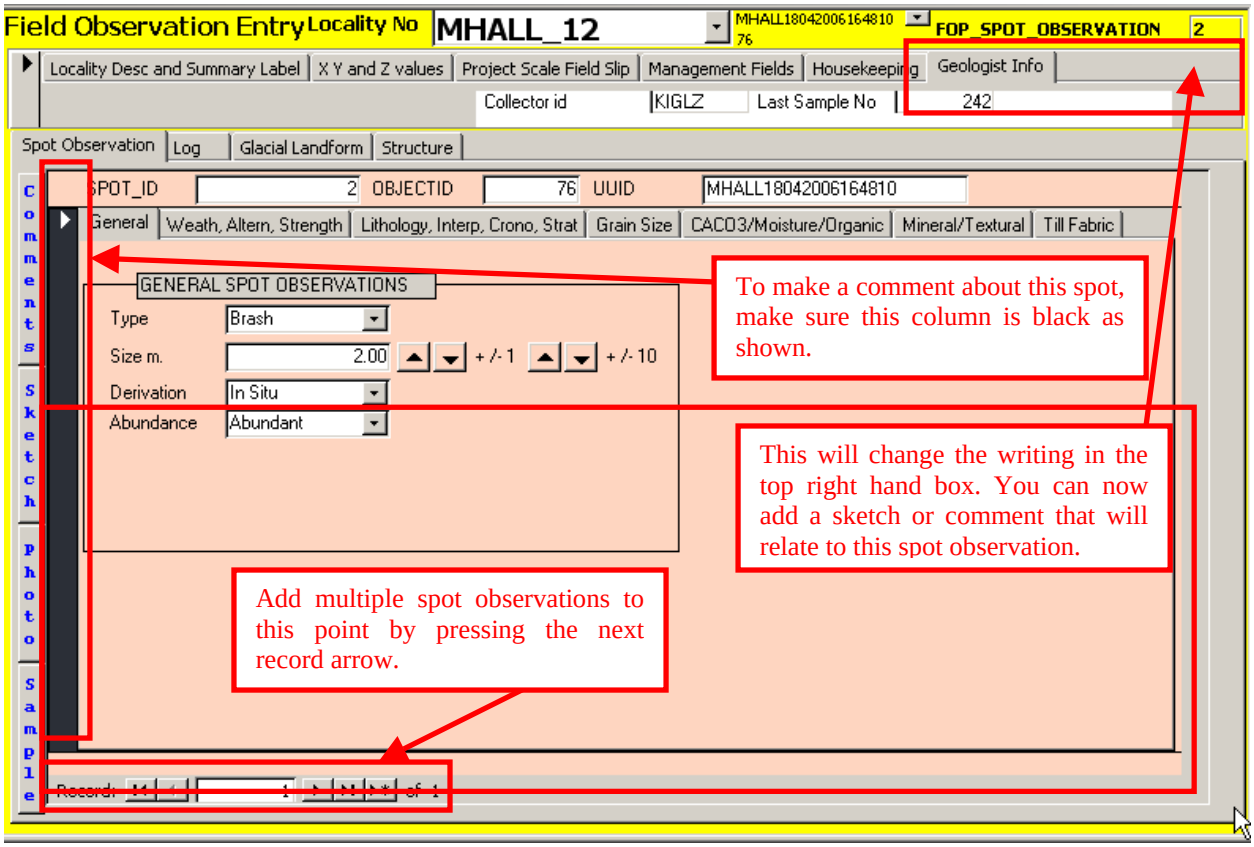
The user can perform several tasks from this menu. Dictionaries can be customised (see section 4.6 for more detail), Sample numbers can be entered (see section 4.5.11 for more detail), a text display of the notebook entry can be created (see section 4.7 for more detail), data can be exported to the Geological spatial database (GSD) (see section 6.1 for more detail), and the main menu in Access can be shown or hidden to create more space on the tablet PC. This latter task is achieved simple by pressing the "Show Menu" button.

This form stores information important to the geologist. The geologist can enter their Collector codes here. The collector code may differ depending on what type of sample is being made. You can also enter the starting sample number to ensure that the sample is unique and matches your sample labels.

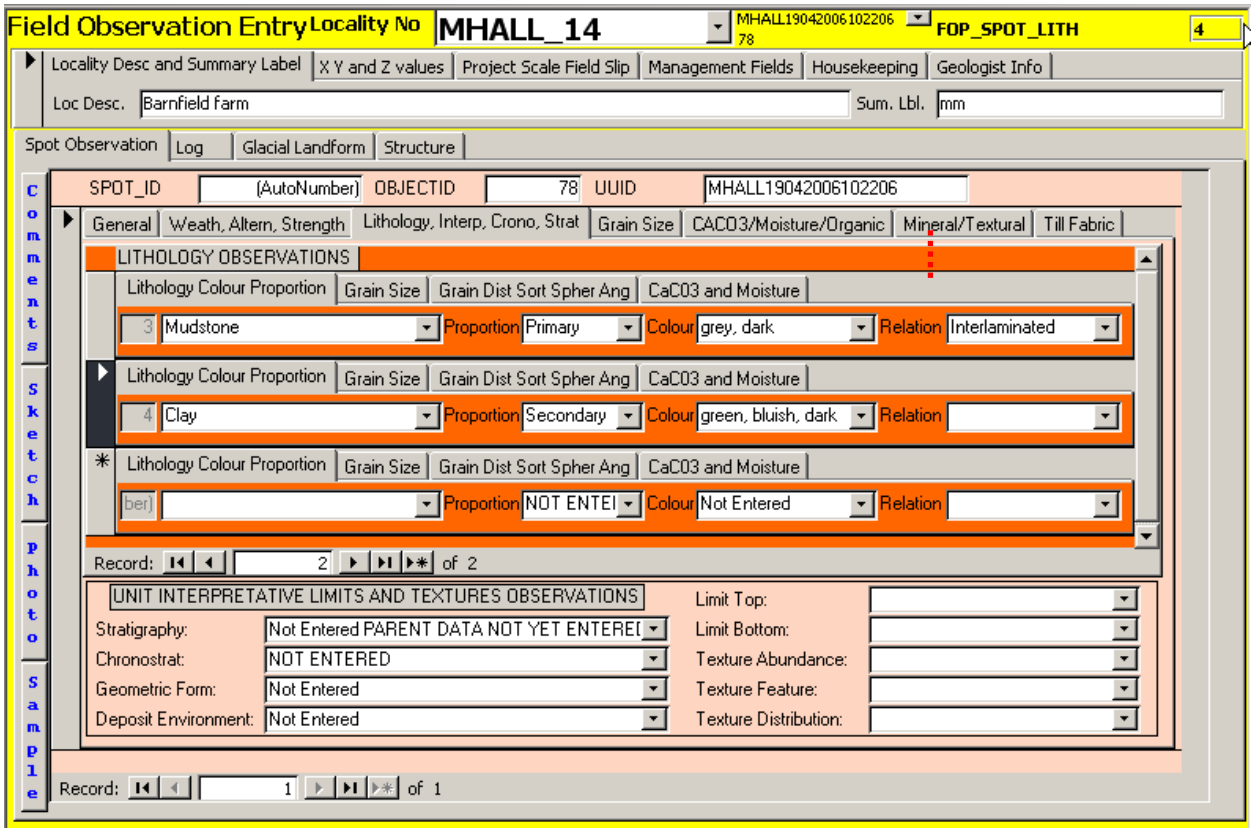
5.5.3 Spot observations



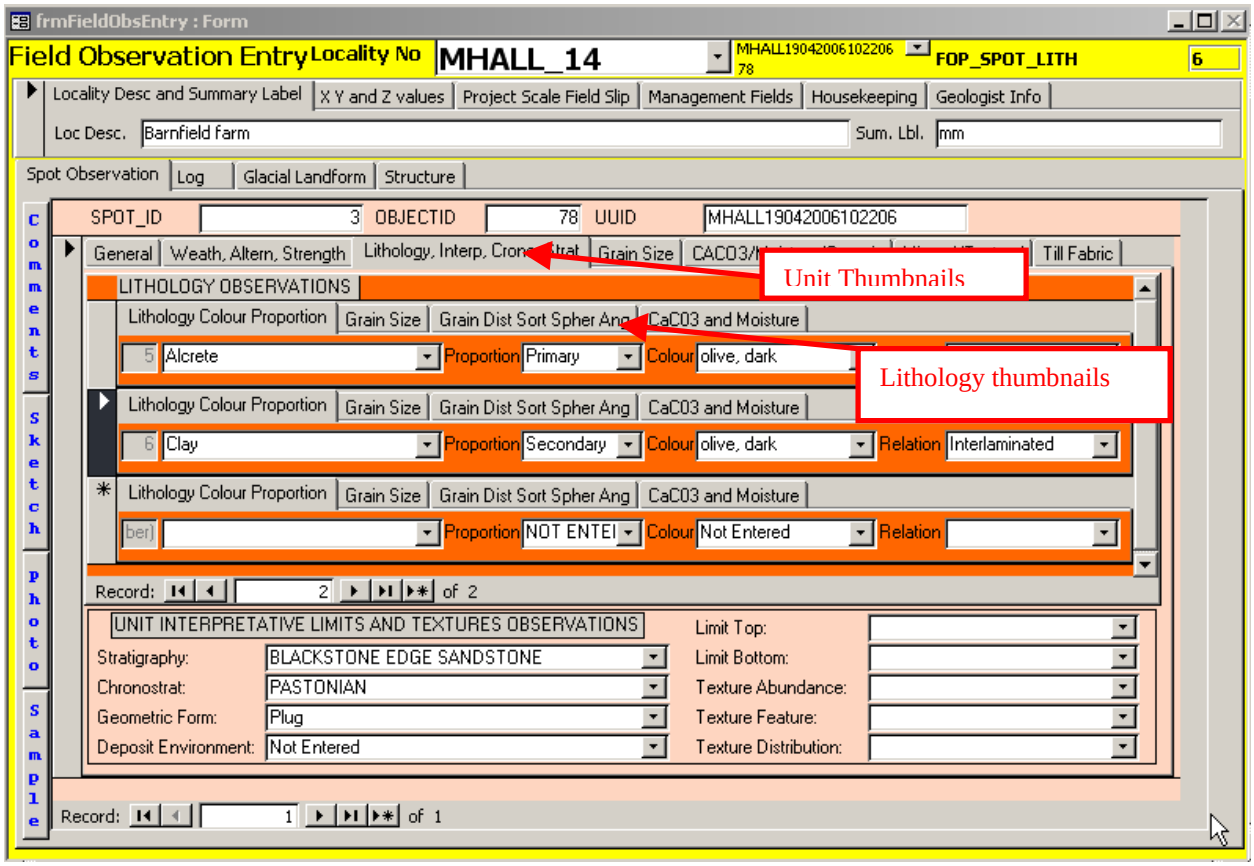
A spot observation is essentially a two dimensional log (think of a log which only comprises one unit). An example of a spot observation would be brash. The types of measurements you record are dependant on the type of spot observation you are making. The example above shows the measurements you may make for brash.



You can take several measurements or make descriptions here about the spot observation by entering through the forms entitled strength, weathering, grain size etc.

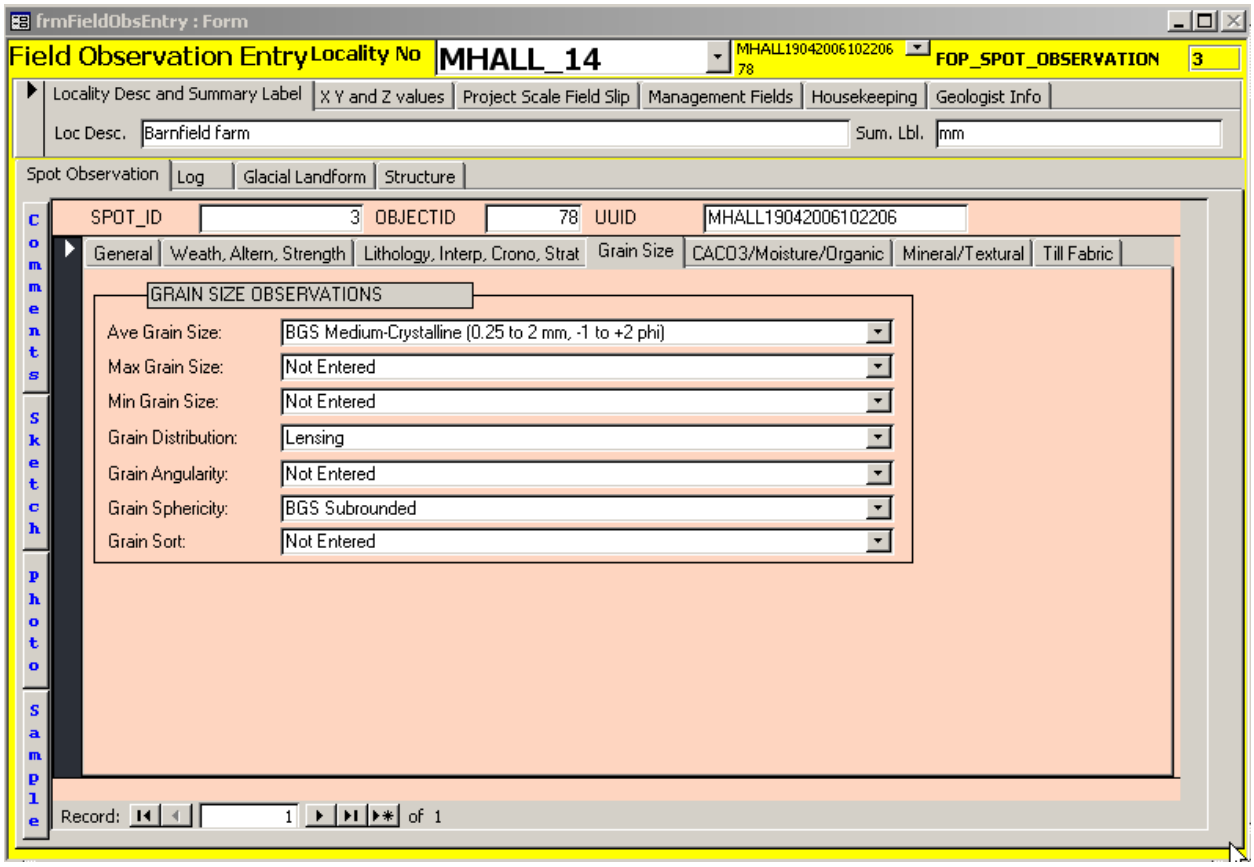


In the above example, the orange area shows we have entered 2 lithologies for the spot observation. The black column shows that we are currently looking at lithology 2 and any sketch, photo, sample or comment taken now would relate to lithology 2 - clay. To navigate through different lithologies, either use the scroll down list or use the default Access record mover in the lithology section (i.e. within the red box in the above diagram).

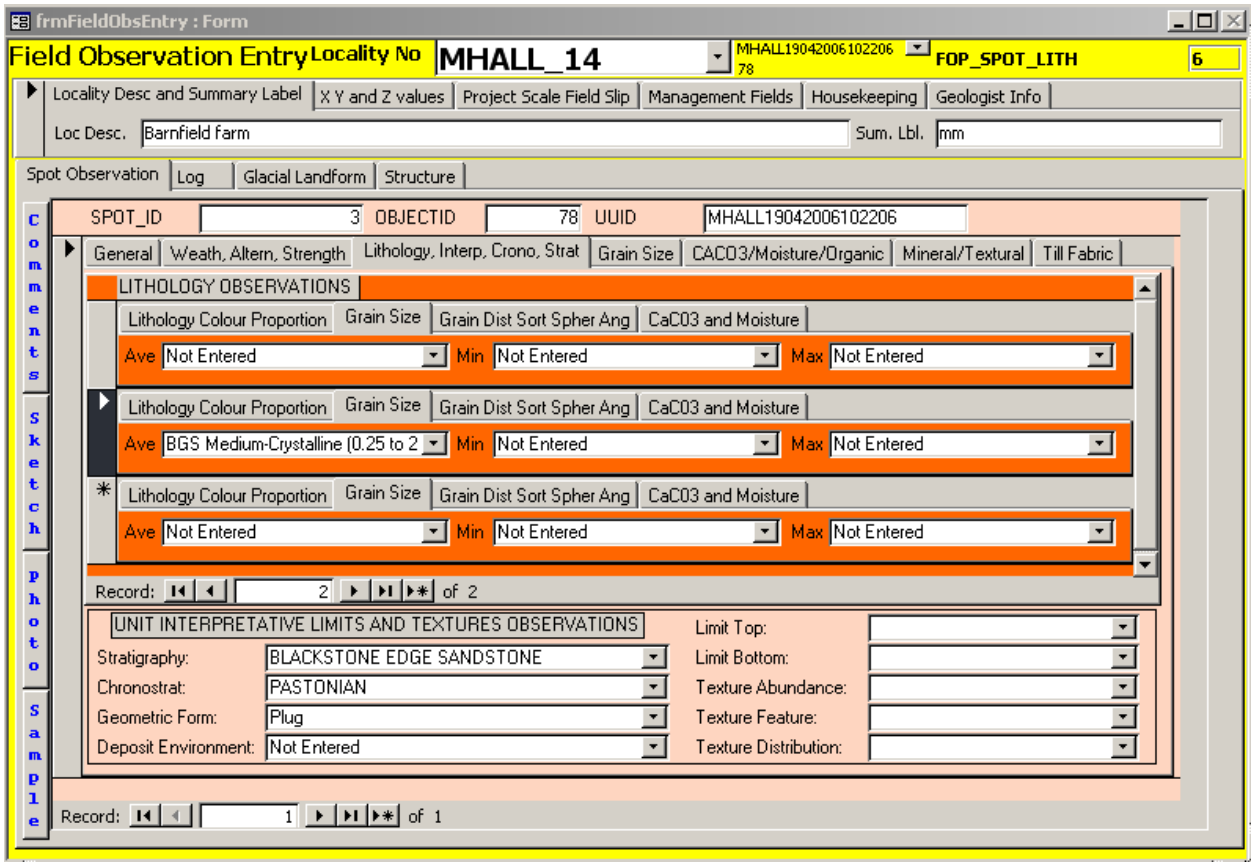


The area shown in orange in the diagram above lets the user enter information relating to the lithological distributions within the unit as a whole. The unit thumbnails also store information about the whole unit, where as the lithology thumbnails just store information about that lithology within the unit.

The system currently gives the user flexibility as to whether they wish to write information (such as grain size, and CaCo3 content) pertaining to the whole unit or just a particularly lithology in the unit. The user must decide in the field, which is more appropriate.

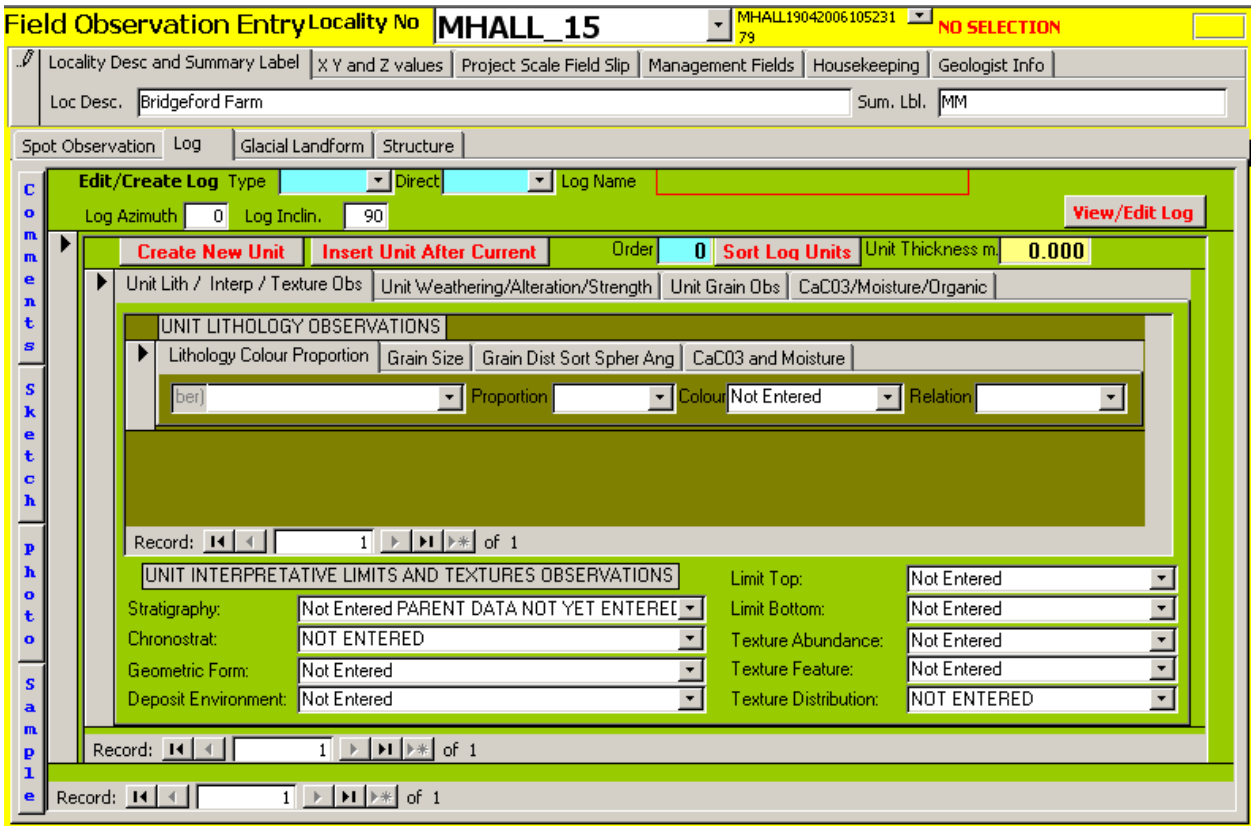


The example above shows how grain size information may be entered about the whole unit.

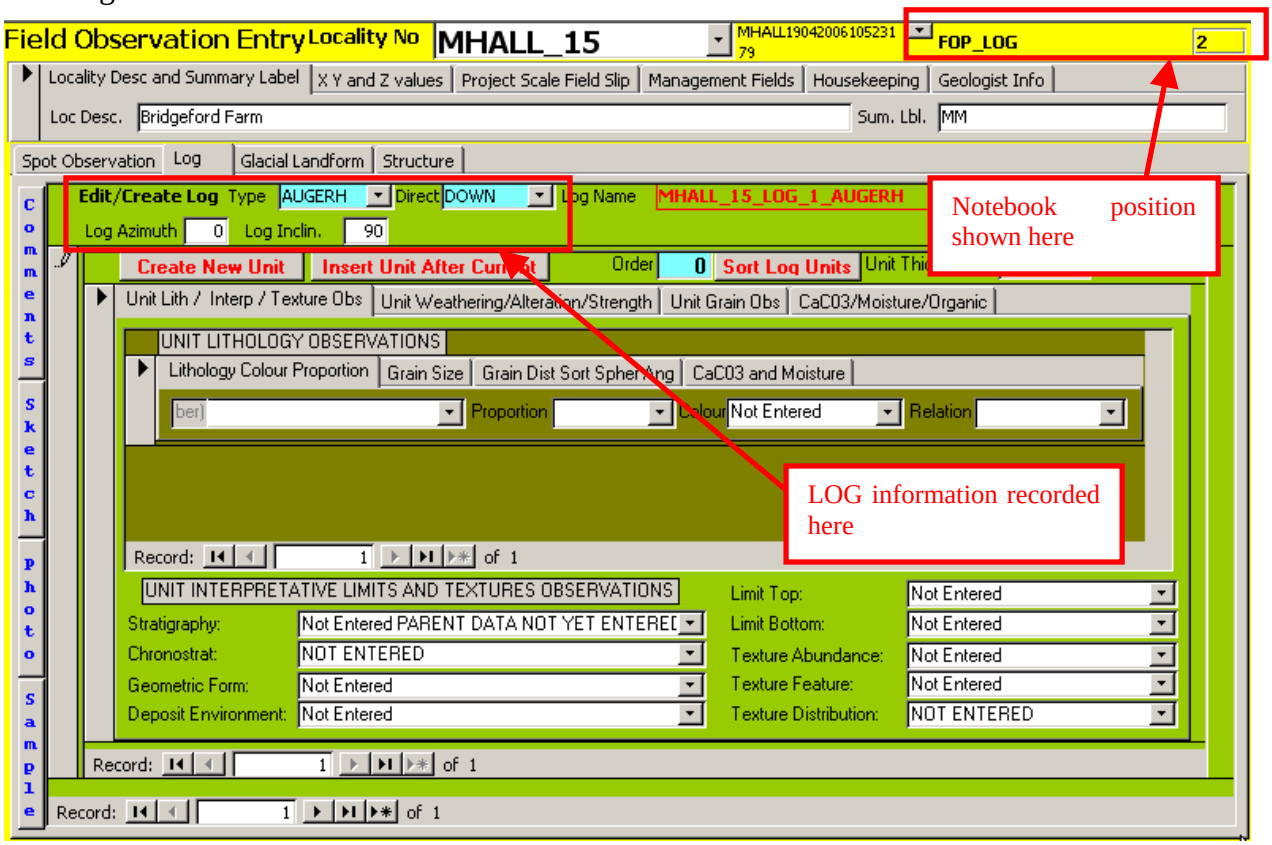


Whereas this example shows how a user may enter grain size information about the second lithology in the unit.

5.5.4 Logs

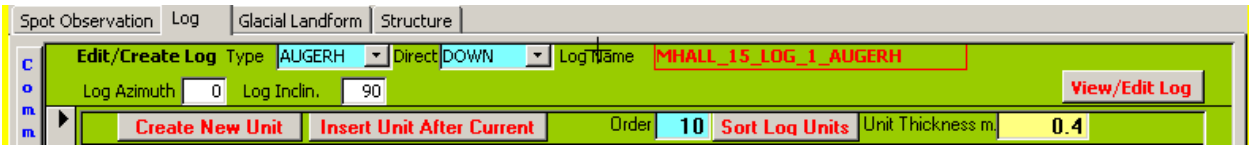


Logs (Augers, sections, quarries etc) can be entered in the log section. The log for is shown in the image above.

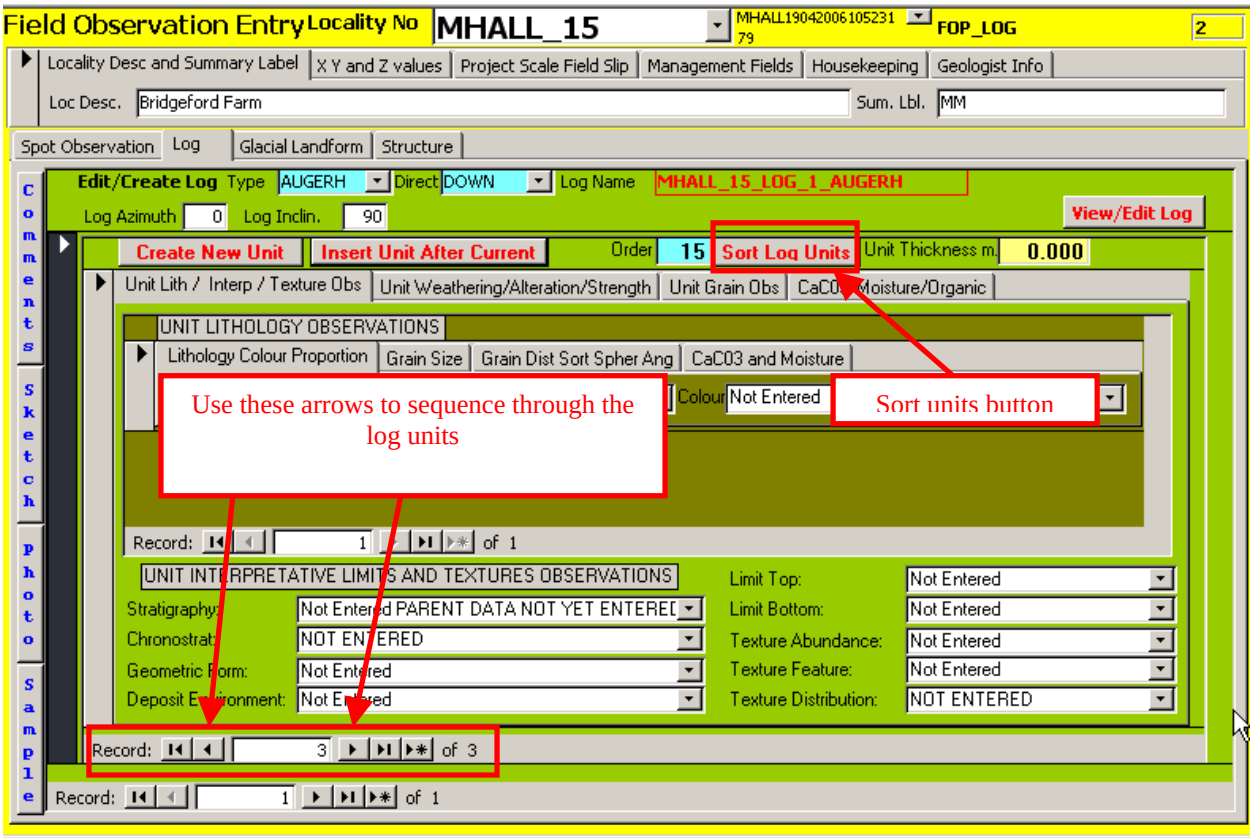


The user must first select the type of log and the direction of logging before they can enter information about the log units. Notice how the top right hand corner of the form (shown in the image above) has changed from FOP to FOP_LOG indicating that this is the section of the notebook the user is working in.

5.5.4.1 CREATING LOG UNITS



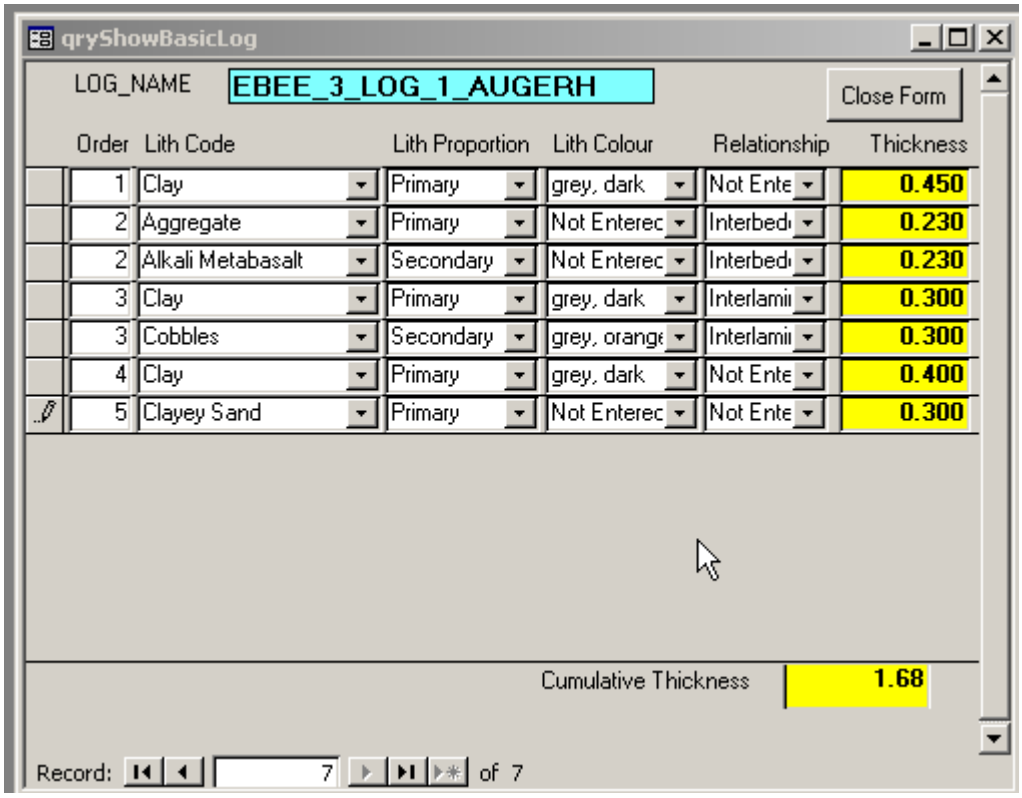
The user can create a new log unit using the above section of the form. They have already entered information about the log and can now create one or more units within the log. Every time the "create unit" button is pressed, a new unit is created. A unit is automatically given a number in increments of 10. So the first unit created will be 0, the second will be 10, the third 20 and so on. The system was designed to do this so that units could be inserted between units. So, if the user pressed the "insert after" button whilst viewing unit 20, a unit 25 would be inserted between unit 20 and unit 30. The "insert after" button inserts a unit at an increment of 5. This would mean that if more than one unit was inserted after unit 20 and before unit 30, two units with an order of 30 would be recorded in the system. It is recommended that these "order" numbers are edited by the geologists to normal sequential numbers 1 to n when the log is completed in the field. Unit thickness should be entered in the yellow box. Thickness is in metres, so the thickness shown above would equate to 40cm.



By pressing the "sort units" button, the order of units can be sorted in the correct order so that the user can sequence through the log from top to bottom correctly using the unit record arrows

For each unit any number of lithologies can be entered, and information, such as grain size, about the unit as a whole ,or a lithology within the unit, can be entered in a similar manner as described in the spot observations section.

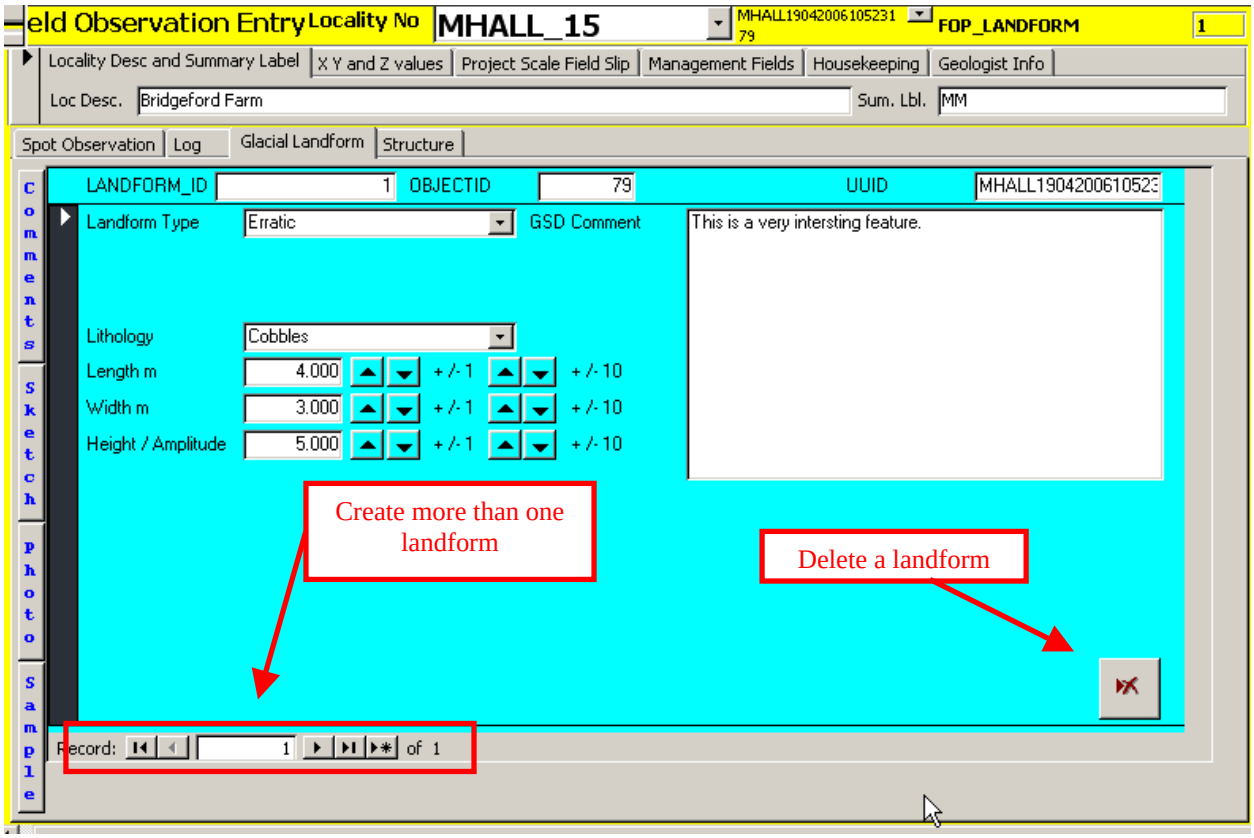
5.5.4.2 VIEWING THE LOG



At any point whilst creating units within a log, the user can press the view/edit log button on the screen. When this button is pressed, the form shown above will appear. In the example above, the user has edited the order fields so that they are numeric 1 – n. Where there are two orders of the same number, it signifies that there are two lithologies recorded for one unit. For example, unit 3 above has both Clay and cobbles. The form shows the log from top to bottom and lets the user edit some of the main details about the log.

The log viewer, shown in the image above, lists the thickness of each unit and adds these thicknesses together to give a cumulative thickness. If there are two lithologies within a unit it displays the thickness of the whole unit for both these lithologies. For example, for the unit ordered number 3, there are two lithologies; clay and cobbles. Unit 3 has a thickness of 0.3 metres. This 0.3 metres is written beside both litholgies. However, only one 0.3 metres is included in the cumulative thickness of the log as 0.3 refers to the whole unit not the lithology.

5.5.5 Glacial Landforms



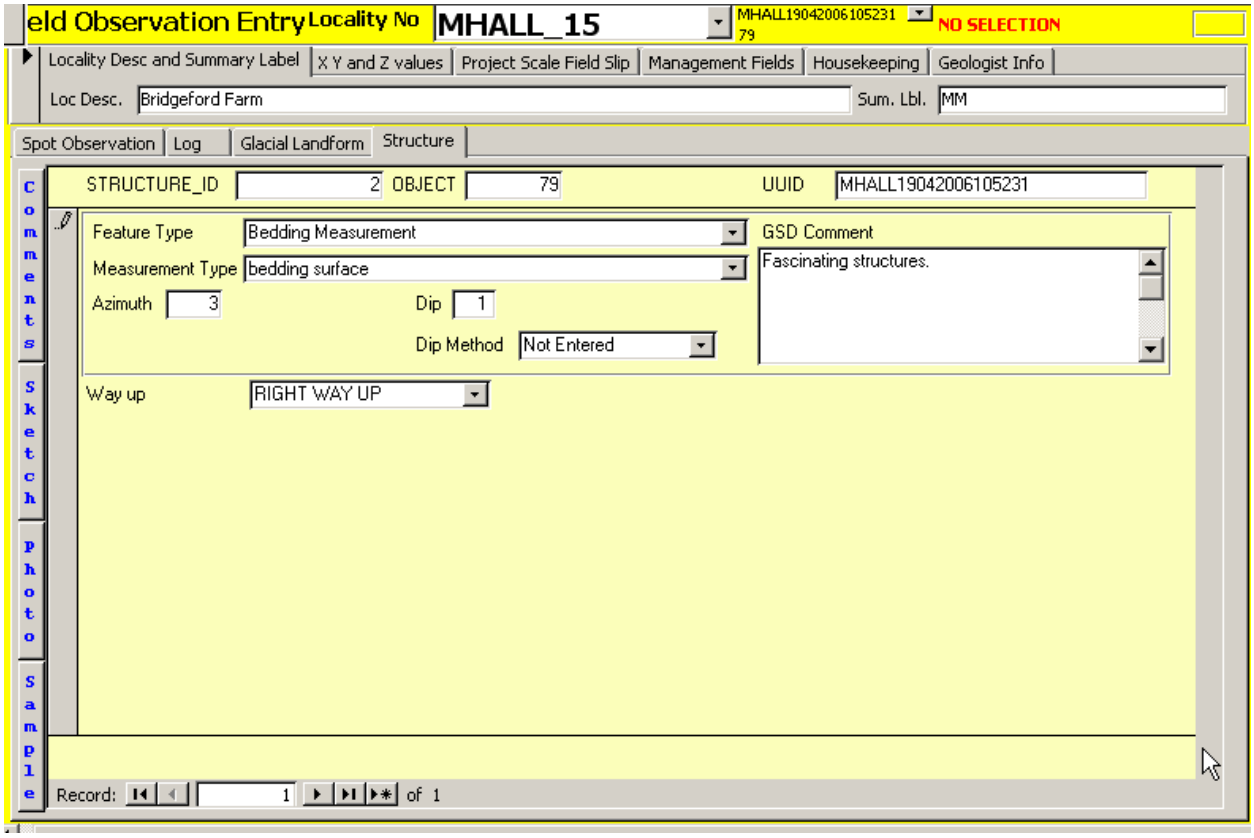
Enter information about glacial landforms in this section of the notebook. Again, the measurements you make in the field are dependant on the landform type being recorded and consequently this is reflected by what boxes appear to enter data into.

When developing the data model, all landforms were considered, but the team only included those landforms that you would actually measure in the field in the system. Other landforms, or the aerial extent of a landform should be recorded using the GeoLine, GeoPoly or Map Face Note tools.

Landforms can be transferred directly into the GSD. As a result, there is comments field within the Landforms section which will be passed into the GSD attribute table on transfer. Users are advised to use this area to write any comments about the landform rather than the normal comment button.

More than one landform can be entered at any one point by pressing the record arrow at the bottom of the Landforms form to navigate to a second record. A record can be deleted using the delete button.

5.5.6 Structures

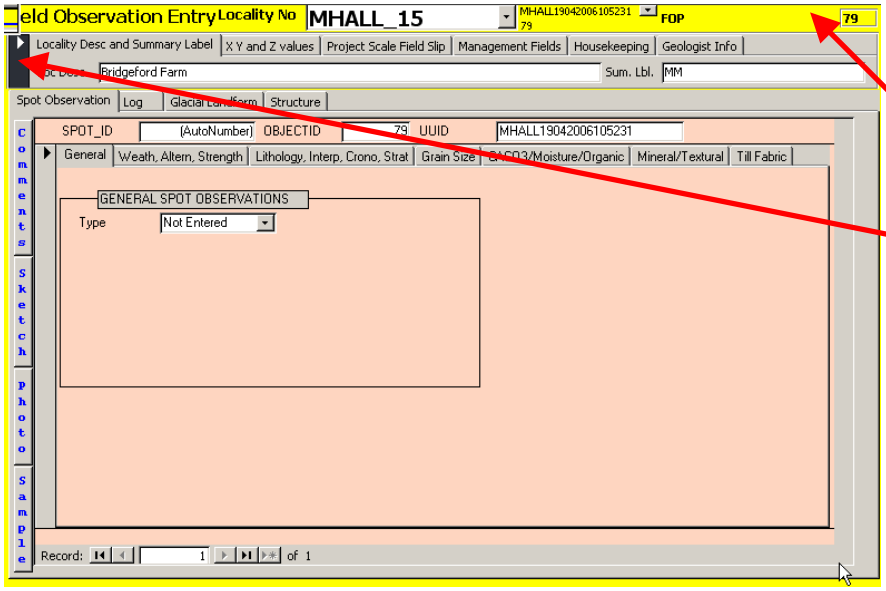


Enter information about structures in this section of the notebook. Again, relevant boxes and dropdown lists for entering data will appear in the form depending on the type of structural measurement being made in the field. Also the GeoLine, GeoPoly or Map Face note tools can be used in the digital field slip to augment your information.

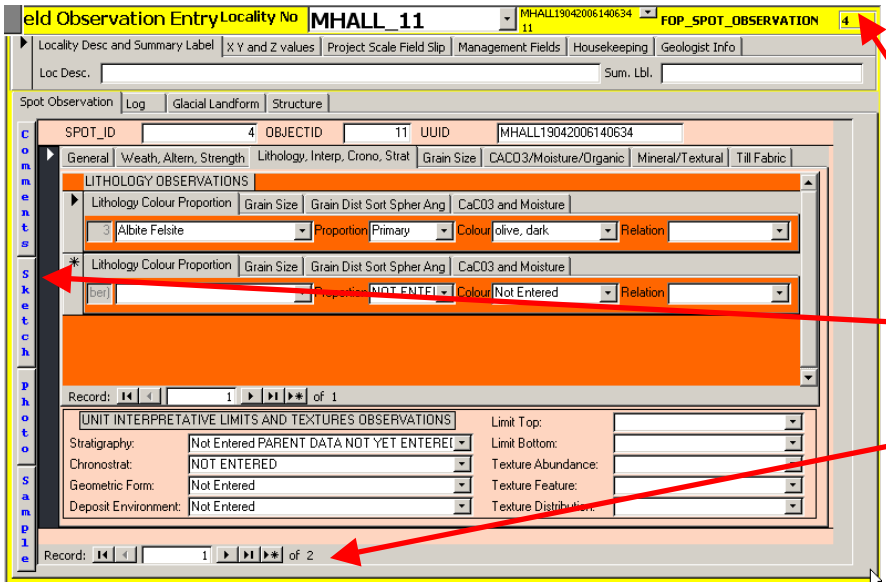
Structures can be transferred directly into the GSD. As a result, there is comments field within the Structures section, which will be passed into the GSD attribute table on transfer. Users are advised to use this area to write any comments about the landform rather than the normal comment button.

5.5.7 Setting the right location, before entering comments, sketches etc

As noted previously, the user can ensure that they are entering a comment, sketch, photo or samples about the correct thing by ensuring that the black bold text displayed in the top right hand corner of the notebook reads what the user wants to relate the comment, photo, sample or sketch to. The following images show different scenarios depending on which part of the form the user has last used. The black filled columns are a useful guide to this, and if the user clicks within these areas, the text in the top right hand corner of the notebook should change.

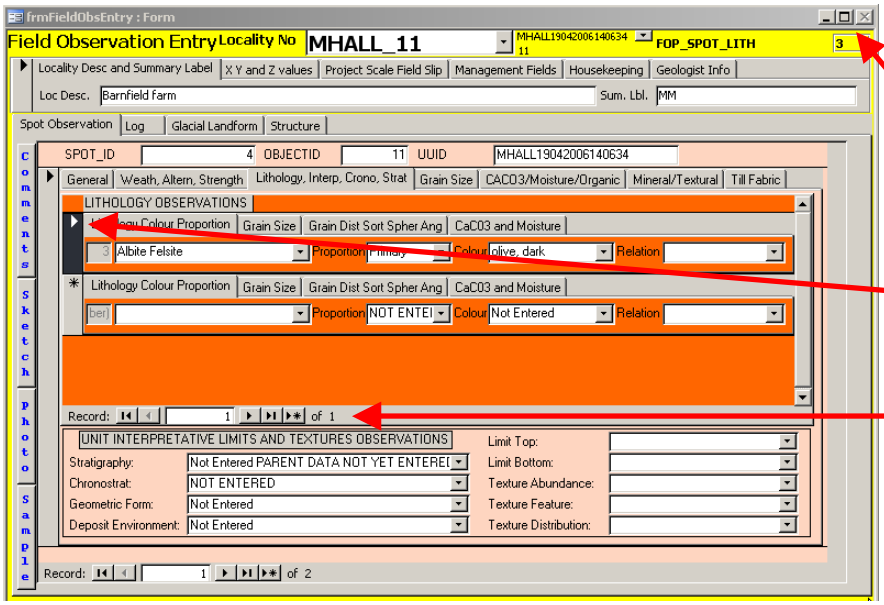


Indicates that the comment etc will refer to the field observation point (FOP) as a whole



Indicates that the comment etc will refer to the fourth Spot observation recorded in the database.

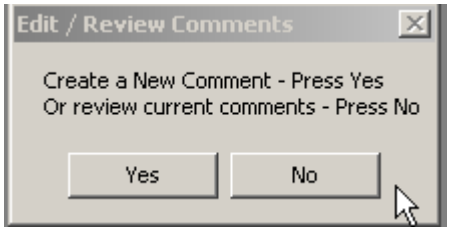
Indicates that the user is viewing the first of two spot observations at this site.



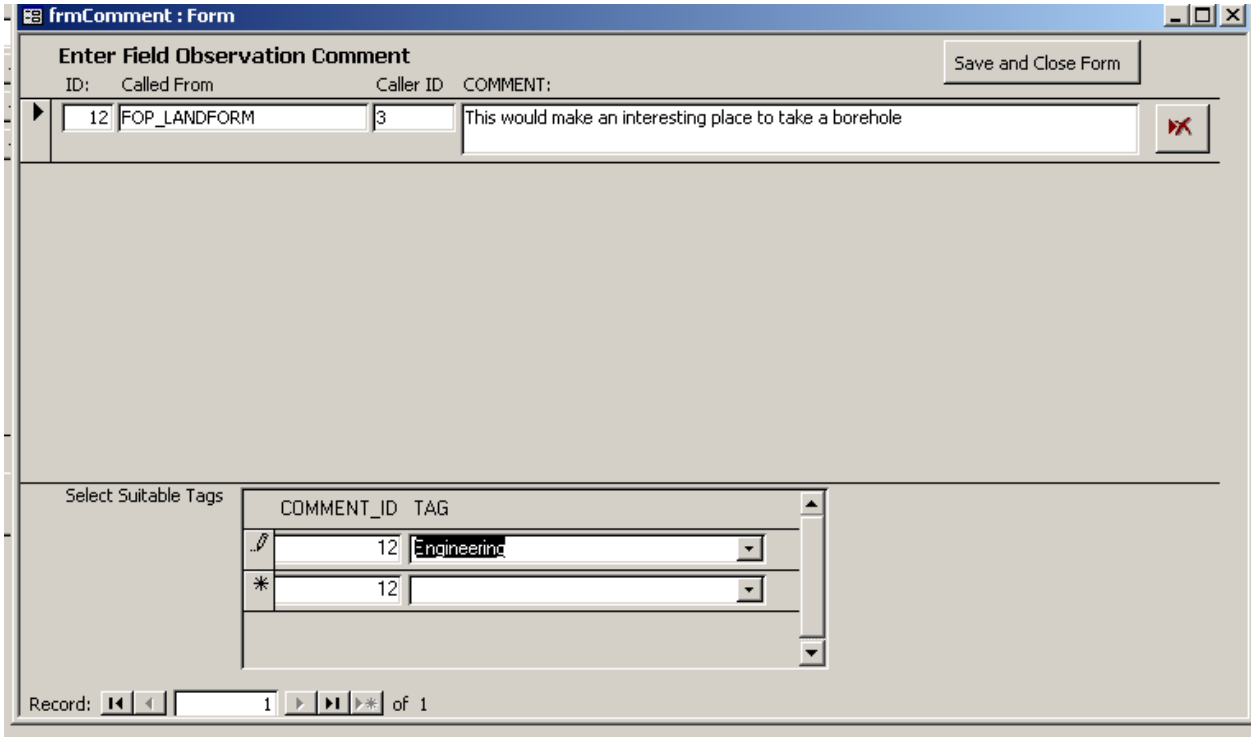
Indicates that the comment etc will refer to this lithology – the 3rd recorded in the database.

Indicates that the user is viewing the first of only one lithologies recorded for this, the first of 2 spot observations , at this site.

5.5.8 Comments

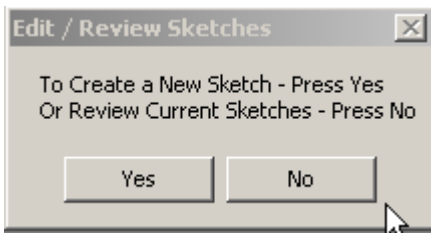


When the blue “Comments” button is pressed the user will be asked whether they want to review an existing comment, or create a new comment. The user should follow the instructions as displayed in the image above.

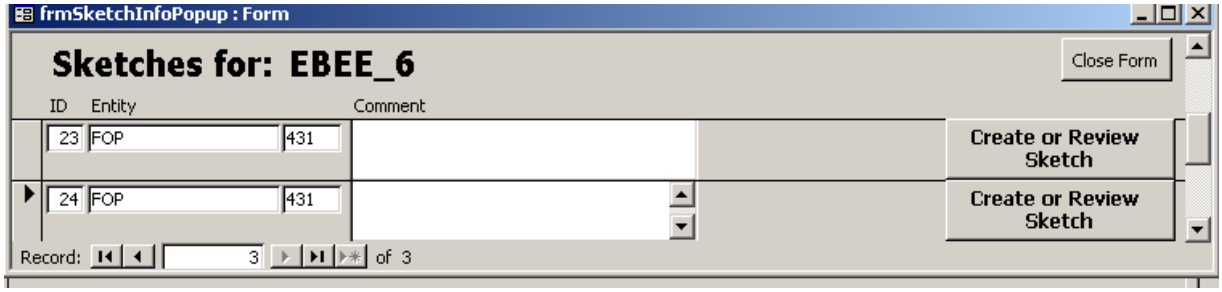


Comments can be made at any point in the system. The position where they were called from is documented automatically this will be the location the comment button was pressed in and will relate to what was displayed in black bold text in the top right hand location of the notebook as discussed in section 4.5.7. Each comment made should be tagged with an appropriate topic tag. More than one tag can be used for any one comment.

5.5.9 Sketches

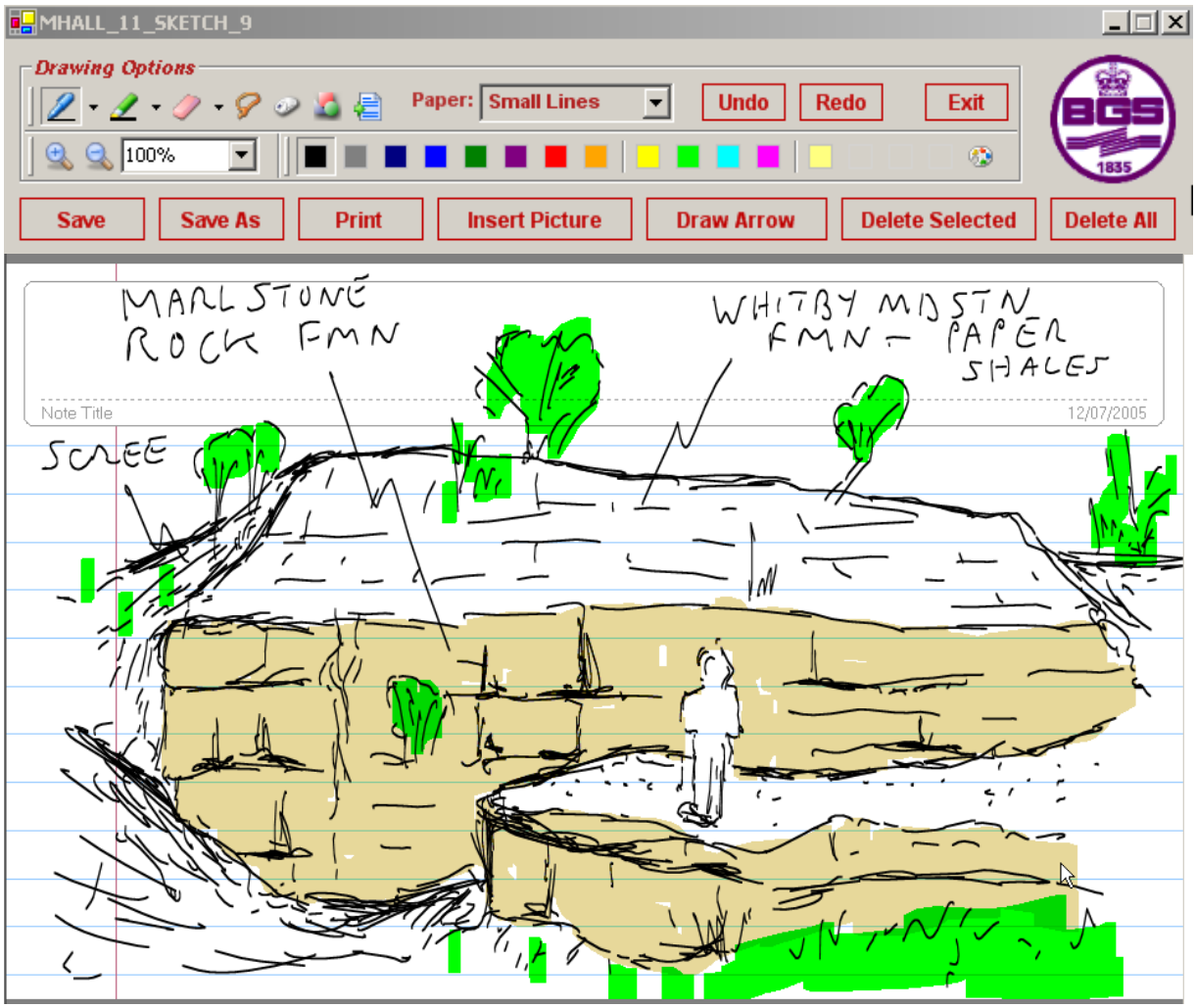


When the blue “Sketch” button is pressed the user will be asked whether they want to review an existing sketch, or create a new sketch. The user should follow the instructions as displayed in the image above.



Sketches can be added or reviewed from the notebook at any point by pressing the sketch button. The form shown above will appear in which you can add or edit a comment about your sketch. The position where the sketch was called from is documented automatically this will be the location the comment button was pressed in and will relate to what was displayed in black bold text in the top right hand location of the notebook as discussed in section 5.5.7

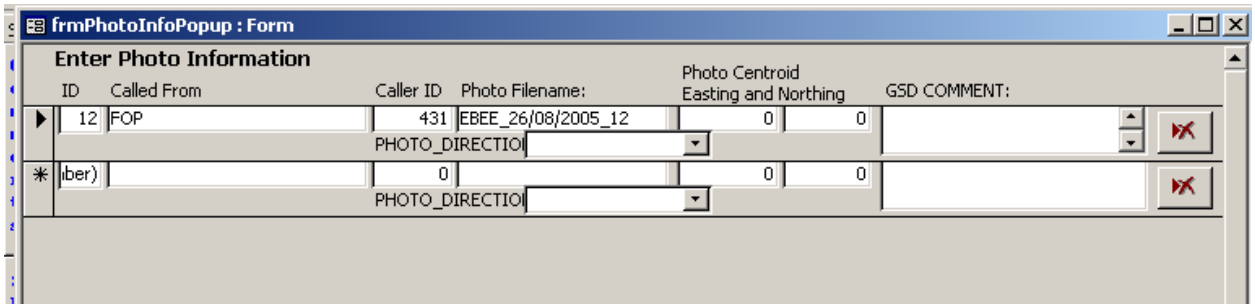
Sketches are created using a customised version of Agilix infinotes called BGS sketch Tool. This programme needs to be installed separately from MIDAS. If this is not installed on your tablet, ask a member of the MIDAS team where to locate the installation file. Help instructions can be obtained from the installation file.



5.5.10 Photos

When the blue "Photo" button is pressed the user will be asked whether they want to review an existing photo entry, or create a new photo entry. The user should follow the instructions as displayed in the image above.

Metadata about photos taken in the field can be added through the photo forms. The photos will remain on your camera until you upload them to your PC. When you do this, you should rename the digital photos with the filename given by the photo information form. There is the option to delete a photograph using the delete button in red.

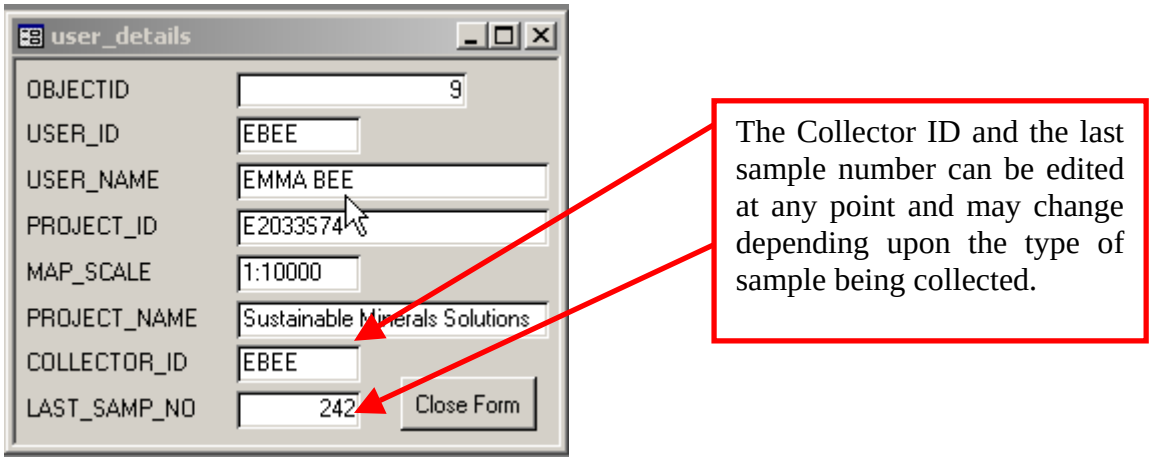


Hyperlinking to photographs will be considered for future releases of the system as will Bluetooth transfer if speed of transfer increases and the cameras increase in resolution and decrease in cost.

5.5.11 Samples

Before you can take samples using the MIDAS system, each geologist must set up their Collector code number in the database on the tablet PC. This is done through the housekeeping section of the notebook.

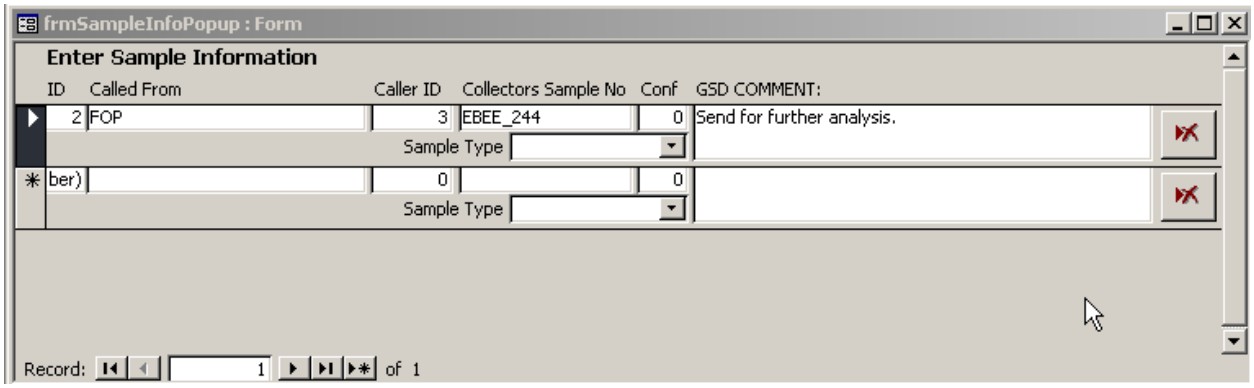
The user should press the "Edit Collector/sample no" button before taking the system out in the field and make the appropriate changes to the form which is displayed below.



Geologists should have been issued with sample number books when they joined BGS. The numbers and Id's written in the above form should reflect the geologists user ID and sample number in their relevant sample book.

For information, the user can see the user name, ID, project details and map scale they registered in ArcMap. These should not be edited here unless absolutely necessary.

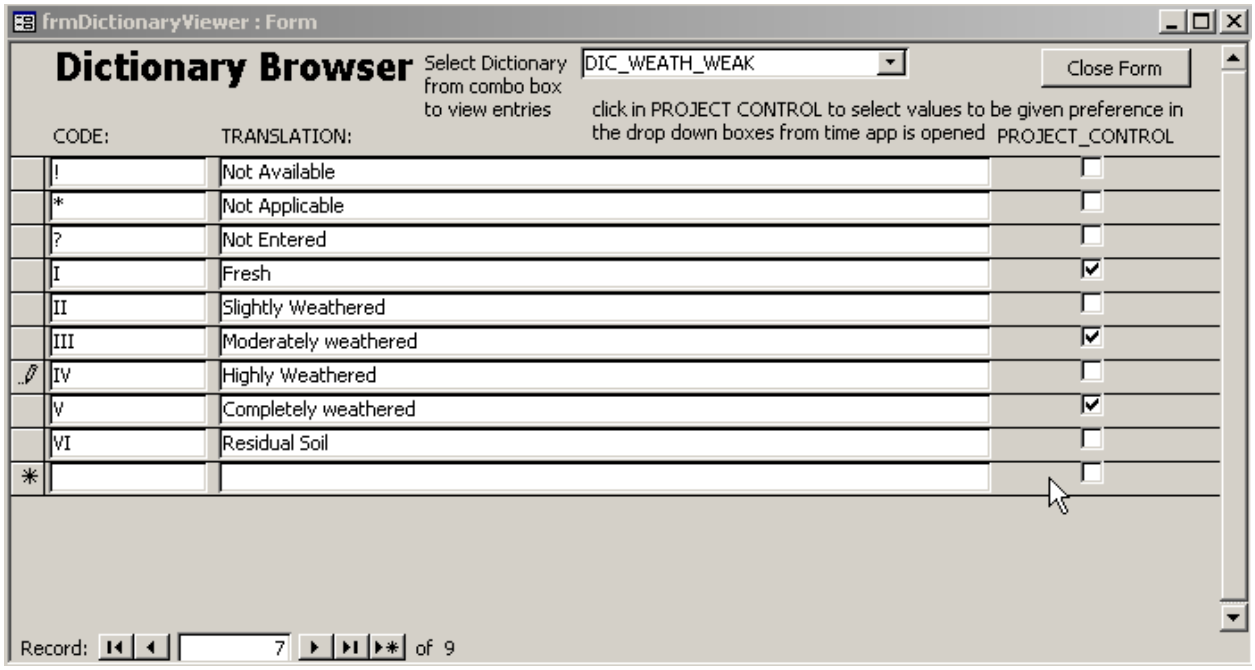
Once the "blue "sample" button has been pressed the following form will be appear and information can be entered about the sample. There is the option to delete a sample using the delete button in red.



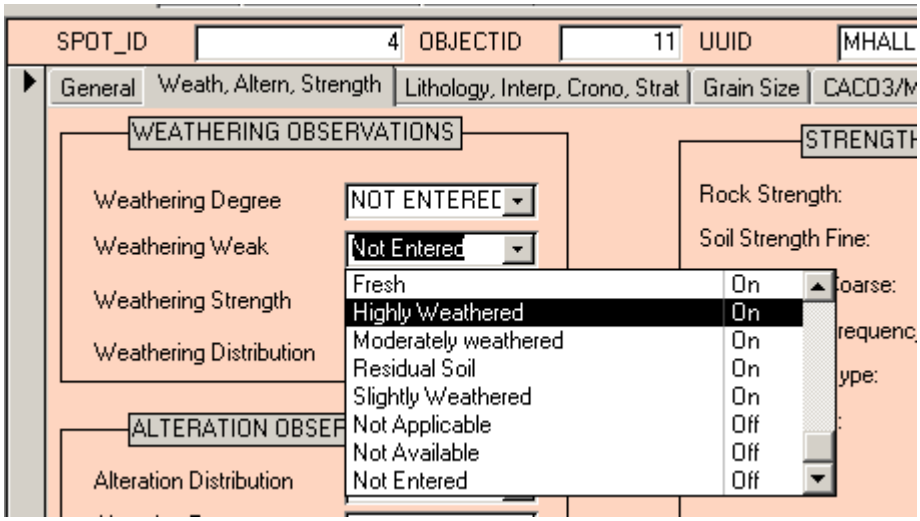
5.6 CUSTOMISING PROJECT DICTIONARIES IN THE NOTEBOOK

The data manager or user can select the dictionary values a project uses most often so that they appear at the top of a dictionary listing by pressing the view manipulate dictionaries button in the housekeeping section of the notebook, as shown below.

This action will bring the following form to view. The user can then select the appropriate dictionary to customise from the drop down list (combo box) and then tick or untick values depending on whether the value should be listed at the top of a dictionary list in the system. The example below shows the values for the DIC_WEAT_WEAK dictionary.



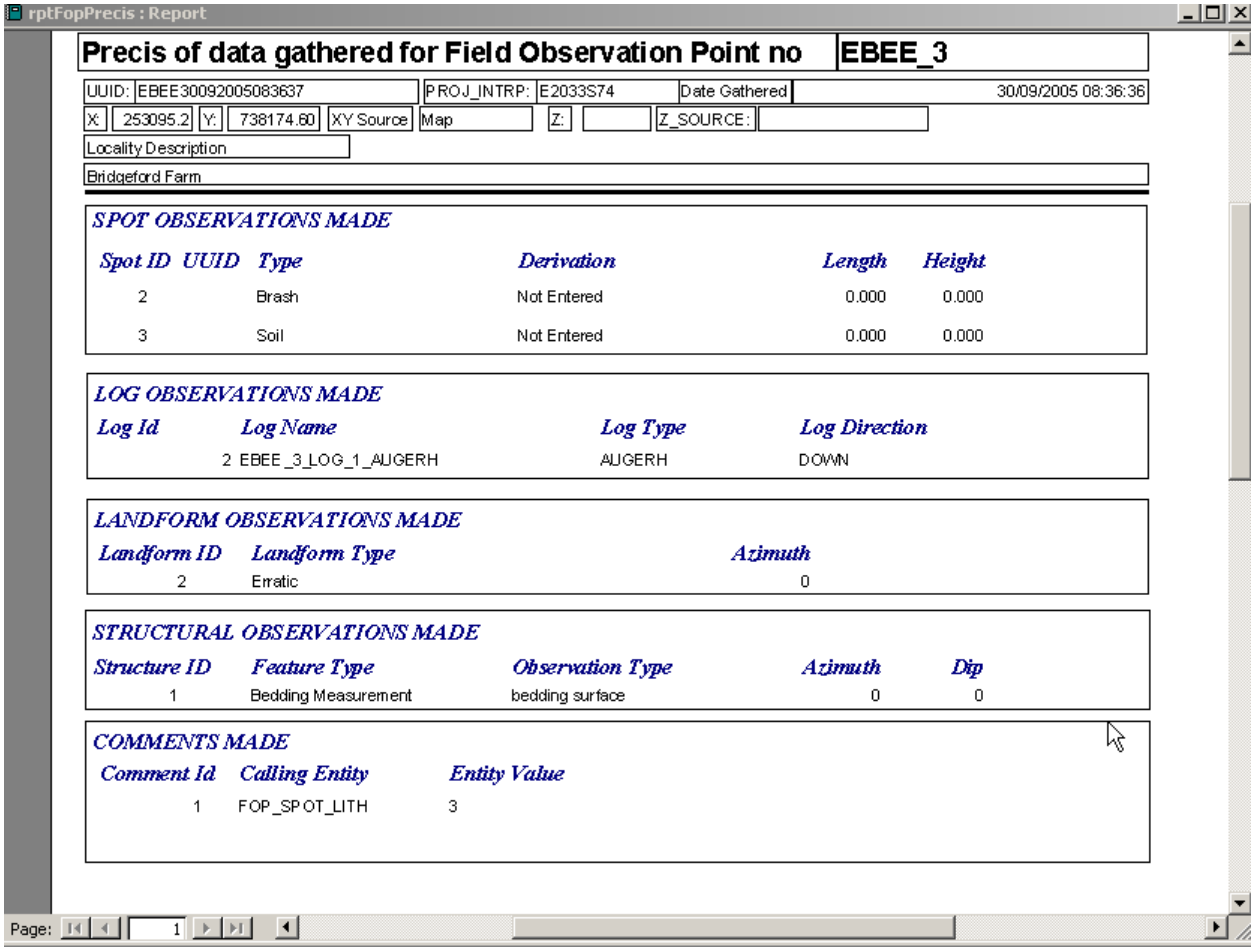
The results of the above customisation can only be seen when the notebook application is re-opened. They can then be seen within the Weathering sections of the notebook (so within Spot or Log). The image below shows that the three values that were ticked in the dictionary browser appear at the top of the drop down list. They are in alphabetical order. The other values are still accessible, but appear below those values where the user had indicated a preference.



5.7 VIEWING THE PRECIS OF THE OBSERVATION POINT

If the user wishes to see a holistic view / report of the notebook data for the given observation point they can create a précis by pressing the “View précis of FOP” button in the housekeeping section of the notebook.

The report will appear in a format similar to that shown below. To close the report, simply click on Close in the Precis Report Toolbar; clicking on the red X will close Access. The plan for future versions of MIDAS is that the user will be able to hyperlink to these reports from with ArcMap. Until then, the user can manually export the précis using the file export button in Access and then set up their own hyperlink to the file in ArcMap.


rptFopPrecis : Report

Precis of data gathered for Field Observation Point no EBEE_3

UUID: EBEE30092005083637 | PROJ_INTRP: E2033S74 | Date Gathered 30/09/2005 08:36:36

X: 253095.2 | Y: 738174.60 | XY Source: Map | Z: | Z_SOURCE:

Locality Description: Bridgeford Farm

SPOT OBSERVATIONS MADE

Spot ID	UUID	Type	Derivation	Length	Height
2		Brash	Not Entered	0.000	0.000
3		Soil	Not Entered	0.000	0.000

LOG OBSERVATIONS MADE

Log Id	Log Name	Log Type	Log Direction
2	EBEE_3_LOG_1_AUGERH	AUGERH	DOWN

LANDFORM OBSERVATIONS MADE

Landform ID	Landform Type	Azimuth
2	Erratic	0

STRUCTURAL OBSERVATIONS MADE

Structure ID	Feature Type	Observation Type	Azimuth	Dip
1	Bedding Measurement	bedding surface	0	0

COMMENTS MADE

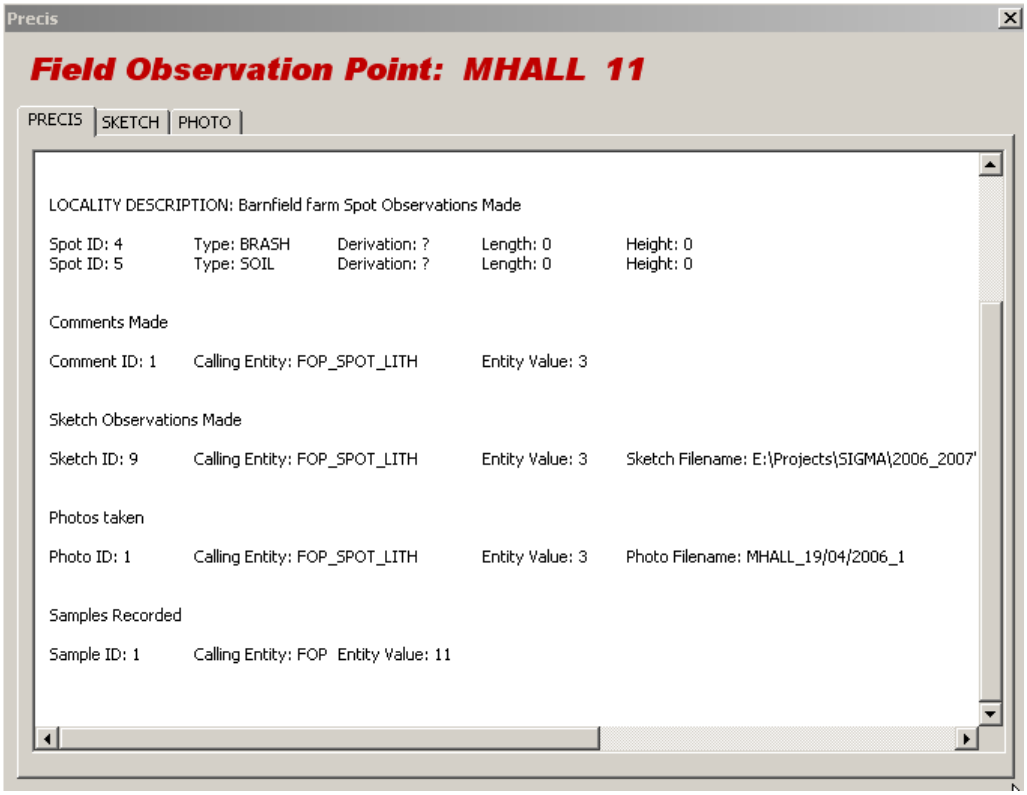
Comment Id	Calling Entity	Entity Value
1	FOP_SPOT_LITH	3

Page: 1

5.8 REVIEWING NOTEBOOK DATA WITHIN ARCMAP

The green information button (précis tool) shown as button 14 on the BGS_DFDC toolbar enables the user to identify on a field observation point feature and view the contents of the notebook for that point in a list. It also enables the user to view any sketches or photographs that have been taken.

When the user clicks on a notebook point the following form will appear detailing the notebook contents for that point:



The user can use the scroll bas to see what observations have been entered at this point. It is also possible to switch between from the précis tab to the sketch tab to view any sketches made as shown below.

The image above shows that two sketches were made at this location. The user can view each sketch in turn by clicking on the sketch name.

The photo tab shown above functions in much the same way as the sketch tab. If the filename for the photograph written in the database is the same as the filename of the photograph itself, and the photograph has been transferred from the camera to the folder within the MIDAS structure called “PHOTOGRAHS”, then the image should be viewable. The tool currently only supports .tif and .jpg image files. Should you wish to support another image format, contact the development team.

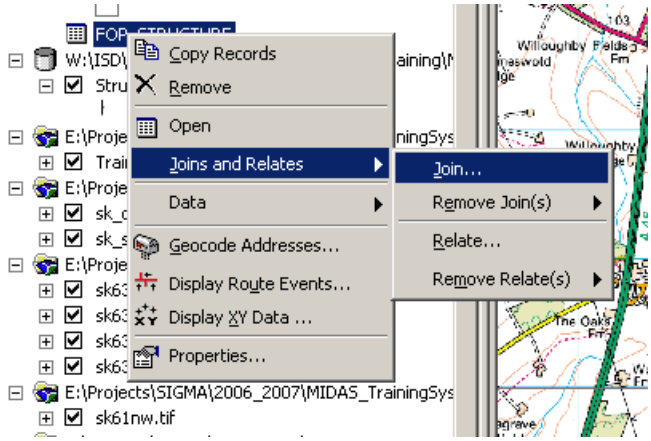
5.9 DISPLAYING STRUCTURAL INFORMATION IN MIDAS

It is possible to display structural measurements taken within MIDAS as a separate layer within the GIS and orientated in their appropriate direction. When you open MIDAS you will see that there is a layer called “Structure Events”. This layer is an Event theme. It is created by adding the tabled called FOP_STRUCTURE from the DFDC.mdb into the GIS. The table in the GIS is displayed in the source tab in the Table of Contents (TOC).

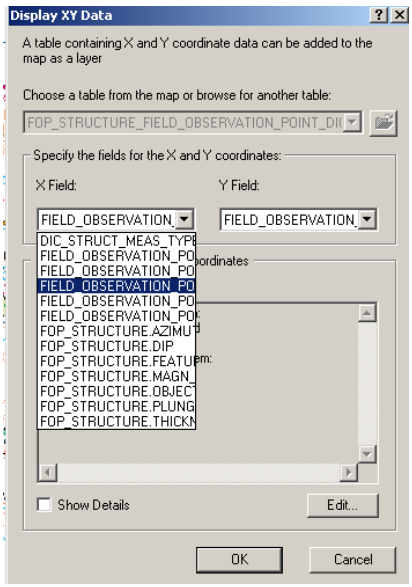
Creating a Structure event layer if it doesn’t exist.

If the Structure events layer is not displayed then you cans et this up yourself.

If you right click on the table in the TOC, a the following context menu will display. It is necessary to make a join to the FIELD_OBSERVATION_POINT based on the UUID in order to join the X and Y data to the FOP_STRUCTURE table. You should also join the filed “CODE” in DIC_STRUCT_MEAS_TYPE to the field “TYPE” in FOP_STRUCTURE table in the same way. This will ensure that the translation of the code to the actual structure type is shown in the GIS.



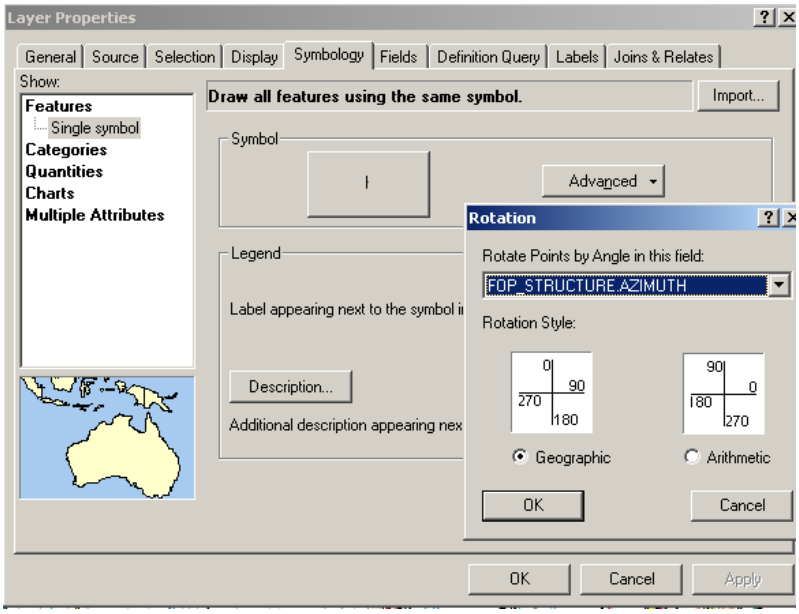
Once the joins are made an event theme can be generated. To do this, right click on the FOP_STRUCTURE table and click Display XY data. The following menu will appear.



The X and Y attributes need to be assigned in order to display the points in the GIS. The X value should be the FIELD_OBSERVATION_POIINT.X attribute (the 3rd FIELD_OBSERVATION_POINT attribute down in the drop down list) and the Y value should be the FIELD_OBSERVATION_POIINT.Y attribute (the 4th FIELD_OBSERVATION_POINT attribute down in the drop down list). Make sure you set the coordinate system to be BNG.

You should now have a layer called structure events.

You will then need to symbolise each and every structure type in the event theme and select not to display values with no data (i.e. everything without structure info). The rotation can then work based on the azimuth field. It is possible to orientate the line by clicking the advanced tab in the layers symbology and choosing the filed FOP_STRUCTURE.AZIMUTH.



You may also wish to have a different event layer to show a different type of structural measurement. Simply right click on the event layer and press copy, go up to the data frame icon and right click and press paste to paste an identical layer into the TOC. You can rename these layers and just symbolise the structural measurement you wish to appear in that layer.

Once you have set this up once, it will be saved in your project and structural measurements will automatically appear in the event layers when you create them using the notebook point tool.

5.10 GPS SETUP INSTRUCTIONS

For onshore field data collection in the UK, the British National Grid (BNG) projection, which has an OSGB 1936 datum, is used. The DFDC dataframe in ArcMap should automatically have this as its projection. If it does not, then it needs to be set as this through the data frame properties dialogue box.

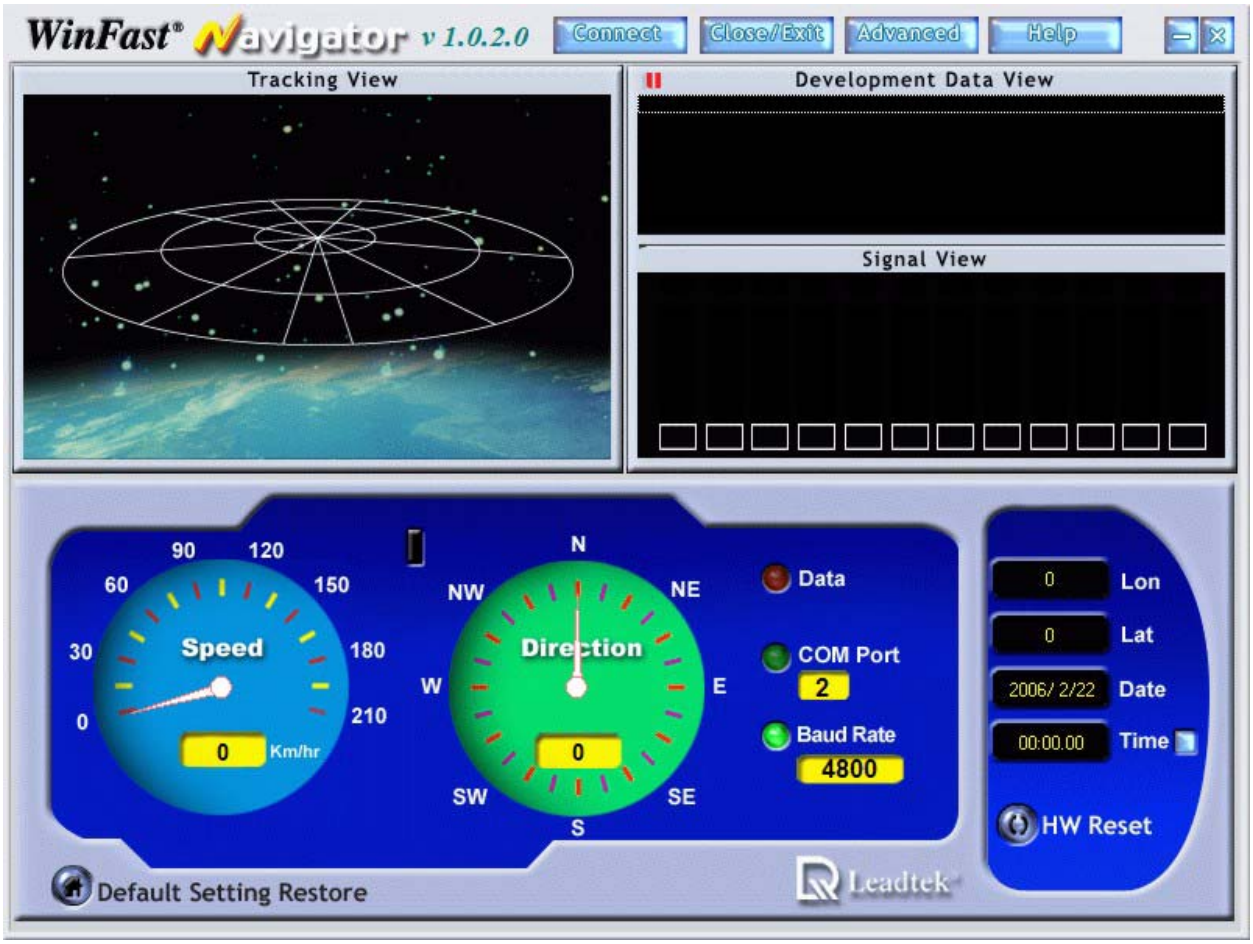
Both the Navman GPS and the integrated GPS on DuoTouch use the world geographic WGS 1984 coordinate system. Since the DFDC dataframe in ArcMap and the GPS use different coordinate systems, it is essential that ArcMap knows how to read in the GPS signal and transform it's coordinates into OSGB coordinates that are accurately viewed within ArcMap. To do this, a file called "TestPointProjection" has been added to the project. This file has a WGS84 projection and forces ArcMap to store the transformation properties required to transform data from a WGS84 projection into BNG (N.B – all the other layers in the data frame should have a BNG projection).

5.10.1 GPS Setup Instructions for the DuoTouch Tablet PC (integrated GPS)

Ensure you follow these instructions before opening MIDAS (ArcMap) if you want to use the DuoTouch GPS.

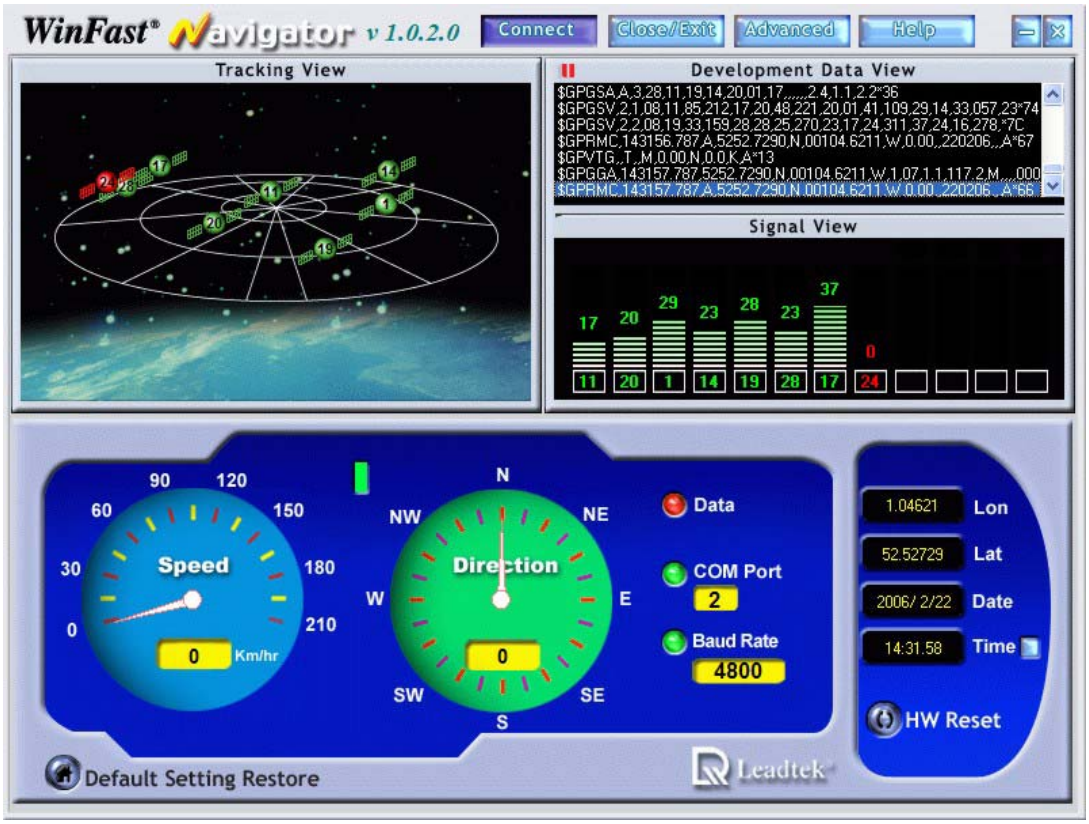
1 – Double-click on the GPS Diagnostics icon on the GoBook desktop 

2 – Click on the Connect button when the window (below) opens.



3 – Wait until the program has locked onto satellites and displays Lat/Long coordinates. In the figure above, the Lat/Long coordinates are 0,0 so there is no lock. A successful lock is displayed in the figure below where at least 4 satellites have turned green and Lat/Long coordinates are displayed, and the light between the Speed and Direction dials is green.

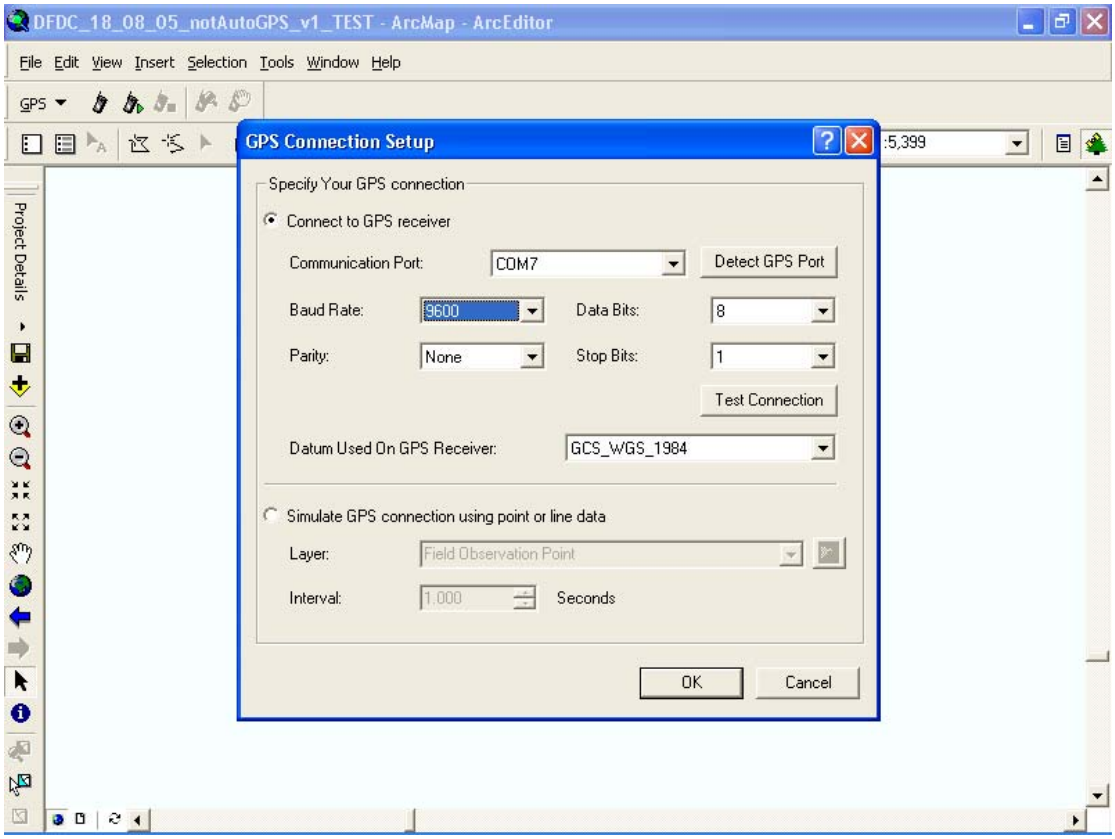
If nothing happens when you click on Connect, check that the Bluetooth COM is turned on, if it is already on there will be a blue light above the symbol. If there is no light, turn off the GPS Diagnostics program and press the hardware Bluetooth button on the back of the tablet and then restart the GPS program. If the GoBook has been set to automatically standby, it might be necessary to turn the hardware Bluetooth off and back on again if no signal is being received.



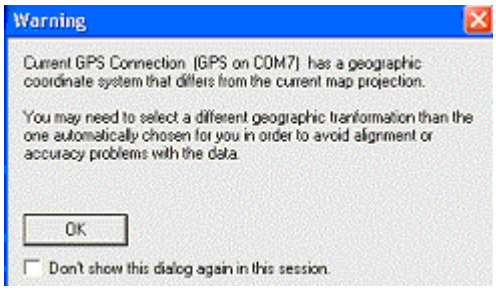
4 – Once the GPS signal is locked, remember which COM port the signal is using (in this case it is COM 2) and close the GPS Diagostics window by clicking on the X on the top right of the screen (make sure it is not just minimised).

5 – You can now open MIDAS from within Windows Explorer and use the GPS toolbar (accessed by pressing the display GPS toolbar button: ) to set up the GPS connection.

6 - Having pressed the GPS Connection Setup Option button  you will see a GPS Connection Setup Dialogue box. Set the Baud Rate to be the figure you remembered from the GPS Diagnostics window (4800 in this example) and similarly for the Com port. The datum on the receiver should be set to GCS_WGS_1984. Everything else should stay as default.

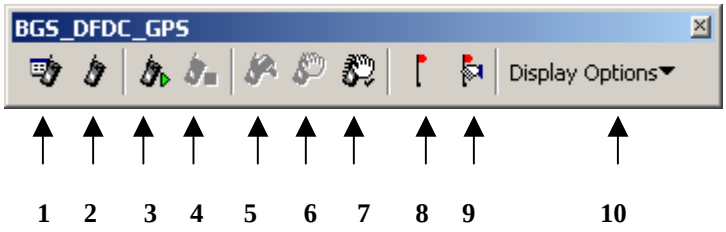


7- Click OK. Then click the connect to GPS icon on the toolbar  .If you get the following warning message, just press ok, it reflects the fact that the GPS uses a WGS84 coordinate system where as the dataframe is using BNG.

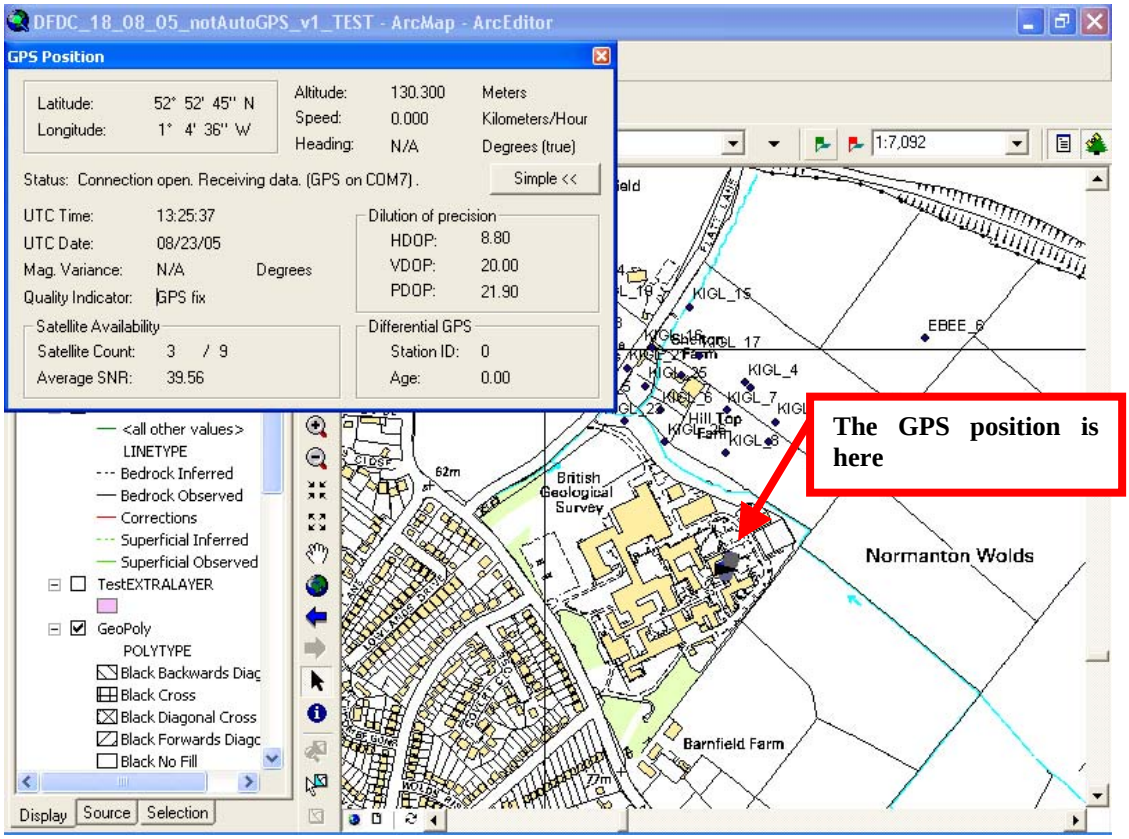


8 - You can also see the GPS readings from the toolbar using GPS position window button  .

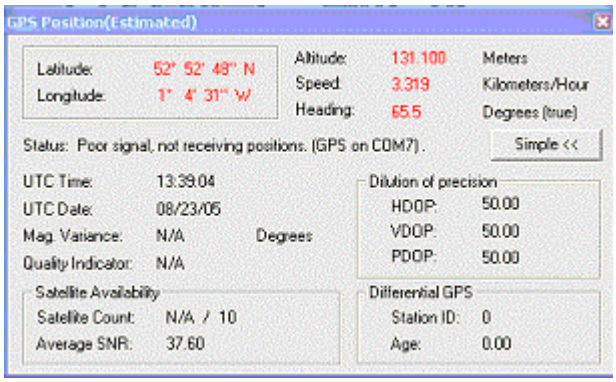
5.10.2 GPS Toolbar



1. *GPS Position Window* – displays useful information about the GPS connection and its current position. In advanced mode it is possible to see the satellite availability as well as time/date and magnetic variances, along with suggested accuracy measurements.



When there is no connection – the GPS window shows an estimated position in red as shown below.



2. ***GPS Connection Setup*** – enables the user to connect to the GPS through the correct COM port and using the correct baud rate.

3. ***Open Connection*** – Establishes a connection to the GPS

4. ***Close connection*** – Closes the connection to the GPS.

5. Zoom to GPS position

6. Pan to GPS position

7. ***Auto pan to GPS position*** – turn off or on depending on whether you want the system to move the map view to the GPS position whilst you are walking.

8. ***Add destination***– Sets the clicked point on the screen as the destination.

9. ***Destination properties*** – Sets the symbol and label for the destination flag and allows the user to show the bearing to the destination from their current location.

10. ***Display options*** – Sets how the GPS symbol is displayed.

5.10.3 Bluetooth Navman GPS Setup Instructions

1 - From the tablet desktop, press “my Bluetooth places”. If a connection to the NAVMAN GPS does not exist, you’ll need to set up a connection to the Bluetooth Navman GPS by following the instructions from point 2 below. If a connection has already been established, follow the instructions from point 8 below to set up pairing. Once the pairing has been set up then ArcMap can connect to the GPS at anytime without the need to do start anything on the tablet first – follow instructions from point 14.

If connection does NOT exist:

2 - Select the Bluetooth Setup wizard under Bluetooth tasks in my Bluetooth places.

3 - It will ask you “what would you like to do?”. Select “I know the service I want to use and I want to find a Bluetooth device that provides that service”. Press “next”.

4 - Make sure the NAVMAN GPS is located within 10 metres of the tablet and is turned on (the power button should flash blue), then Click the “Bluetooth Serial port” service and press “Next” on the tablet PC.

5 - Make sure the option “show all devices” is selected from the drop down list on the select a device menu and press search again. The NavMan GPS should appear. Select the NAVMAN GPS and press Next.

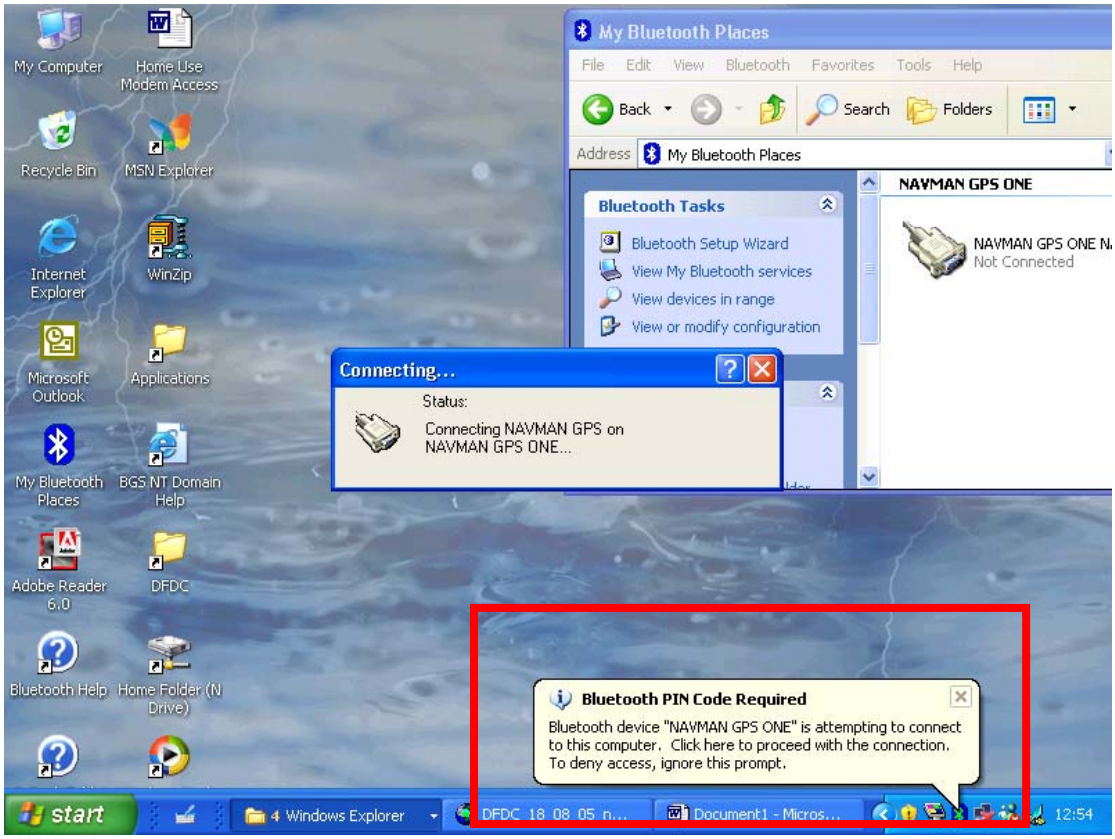
6 - Select Finish.

7 - Once a connection has been made, you shouldn’t need to redo instructions 2 – 6 again. It should always exists, in the same way a printer connection always exists once established.

If connection does exist, set up pairing:

8 - Turn on the NAVMAN GPS and ensure it is located near to the tablet. In “My BlueTooth places” on the tablet, double click on the NAVMAN GPS icon to open the connection.

9 - Each time you turn on the tablet you should be prompted to enter a PIN code as shown below:



You may not be prompted for this again until you next turn on the tablet after it has shut down or gone into standby.

10 - Follow the instruction “click here to proceed with the connection”. Enter the following Password: NAVMAN

11 - Unless you enter the password quickly, the connection will time itself out. It may also time itself out if the GPS has turned itself off. The password should be entered in Capitals. If this does not work, then attempt to enter the password in lower case. This set’s up the “Pairing” of the GPS and the Tablet through a Bluetooth connection.

12 - A message box should appear to say that a serial Port is configured and connected to the GPS. Make a mental note of the serial port that has been connected – it is likely to be port 6 or 7.

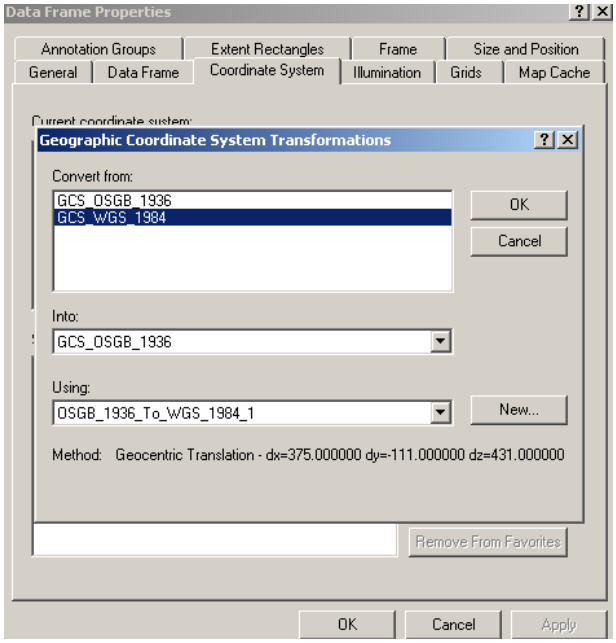
13 - Now the connection is configured, double click on it in the ‘My Bluetooth places’ to actually connect. And follow the ***In ArcMap…***instructions above for the integrated GPS noting that the Bluetooth GPS is using Com 6 or 7.

14 - Once the GPS has a connection to the tablet the blue light on the GSP will flash once. If there is no connection it flashes twice.

15 - Once the connection has been set up, you should be able to open the connection at any time through ArcMap by pressing the connect to GPS button  on the DFDC_GPS toolbar.

5.10.4 GPS in ArcMap trouble shooting

If you think that the GPS position is being shown incorrectly in ArcMap, check the transformation settings in the dataframe properties/coordinate system/transformations dialogue. It should appear as displayed in the image below. If this is not correct, then make sure that the TestPointProjection.shp and a shapefile with BNG projection have been added to the dataframe.


Data Frame Properties
Annotation Groups
Extent Rectangles
Frame
Size and Position
General
Data Frame
Coordinate System
Illumination
Grids
Map Cache
Current coordinate system:
Geographic Coordinate System Transformations
Convert from:
GCS_OSGB_1936
GCS_WGS_1984
OK
Cancel
Into:
GCS_OSGB_1936
Using:
OSGB_1936_To_WGS_1984_1
New...
Method: Geocentric Translation - dx=375.000000 dy=-111.000000 dz=431.000000
Remove From Favorites
OK
Cancel
Apply

5.11 USING THE 'STRUCTURE CONTOUR TOOL'

The purpose of the tool is to calculate Structure Contours to estimate where a geological bed will outcrop. Given the location of an Observation Point where the angle and direction of dip of the bed are known, and assuming the dip is uniform, the tool can calculate an equation for the plane of the bed. From this equation it is then possible to calculate the elevation of the bed at any point. By using a DTM this elevation can be compared with the ground elevation and where the two are equal it can be predicted that the bed will outcrop.

5.11.1 Installation

The Structure Contour Tool should already be installed on the Tablet PC, but if not please follow the instructions below To check if the Tool is installed go to the **View** menu on ArcMap, select **Toolbars** from the view menu and see if there is a toolbar called **Structure Contour Tool**.

You can also use the instructions below to install the tool on your desktop PC. ArcGIS 9.0 (with Service Pack 3) or above must be installed on the PC for the Structure Contour Tool to work. Follow the four steps below to install the Structure Contour Tool:

1) Copy the directory **Structure Contour Tool** in the MIDAS folder to any location on your PC;
2) Open this directory and double click on the file **Setup.bat;**
3) Click on the **Yes** button of the first dialog window to update the registry;
4) Click on the **OK** button of the next dialog to complete the installation.

5.11.2 Using the Tool

To use the Structure Contour Tool:

1) Open ArcMap with a project that contains a DTM.
2) Open the Structure Contour Toolbar (from the **View** Menu on ArcMap, select **Toolbars** and then click on **Structure Contour Tool** from the list of toolbars available).

The Structure Contour toolbar will then become visible:

The Structure Contour Toolbar contains the following three buttons:

 Calculate Structure Contours

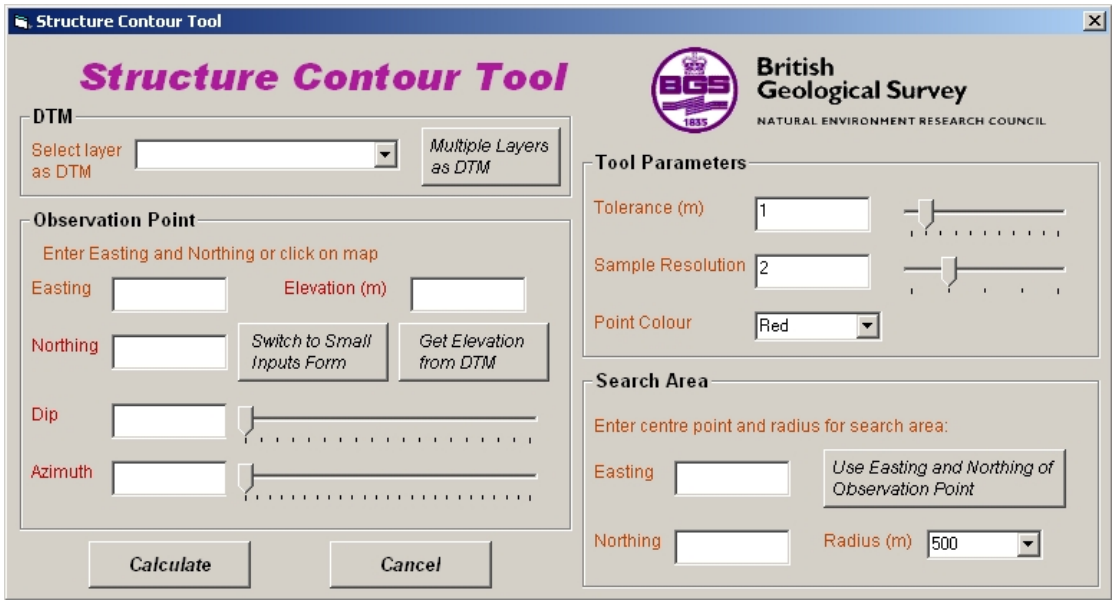
 Delete Structure Contours

 Save Structure Contours as Shapefile

The functionality of each of these buttons is described in detail below.

5.11.2.1  CALCULATE STRUCTURE CONTOURS

After pressing the Calculate Structure Contours button, the user is presented with the following window:

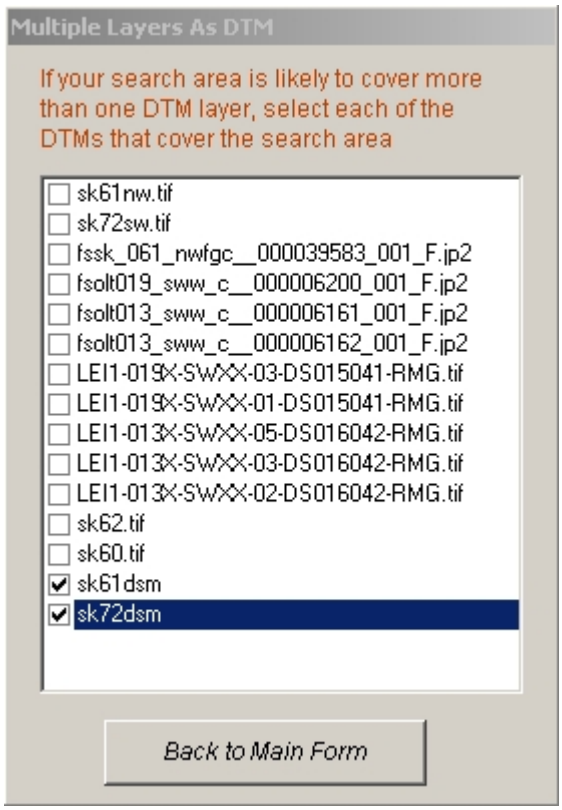


The user is required to enter four types of input: DTM, Observation Point, Tool Parameters and Search Area:

DTM

The DTM input consists of a dropdown menu that lists the raster layers available in the current project (note that this list will therefore also include non-DTM rasters such as OS topographic maps). The user must select the layer to be used to calculate all elevation values by the Structure Contour Tool.

If the Search Area that you are interested in is likely to be covered by more than one DTM, click on the '**Multiple Layers as DTM**' button and you will be presented with the following window:



Make sure that all of the DTM layers that cover the Search Area are ticked and then click on the '**Back to Min Form'** button. The value in the DTM Combo box will now be set to: **Multiple DTMs.**

IMPORTANT NOTE: All raster layers are displayed in the '**Multiple Layers as DTM**' window as it is not possible to distinguish DTMs from other raster layers such as OS 50k sheets. Make sure that **only** DTMs are ticked. Otherwise it is possible that the Structure Contour Tool will attempt to get elevation values from a non-DTM raster layer.

Observation Point

The Observation Point inputs consist of the observed properties of the bed at a known location. They include:

1) **Easting**: The National Grid Coordinate (Easting) of the point.
2) **Northing**: The National Grid Coordinate (Northing) of the point.

Easting and Northing values can be typed in manually or can be entered automatically by clicking on the required location on the map display. As the Inputs window is relatively large and obscures the majority of the map display, the button '**Switch to Small Inputs Form**' has been provided. Pressing this button closes the main inputs form and brings up the following window:

Once this window appears the user simply clicks on the map display to input the coordinates of the structure measurement. When the correct values are entered, click on the '**Back to Main Form**' button to return to the original Inputs window. Note that on returning to the main Inputs window the Easting and Northing values have been populated using those values selected using the smaller window.

3) **Elevation**: The elevation of the point in meters. This value can be typed in manually or populated automatically (after the Easting and Northing have been entered) by clicking on the **Get Elevation from DTM** button. This button uses the entered Easting and Northing values to query the selected DTM and returns the appropriate elevation Z value.
4) **Dip**: The observed angle of dip of the bed. This will be a value between 0 and 90 degrees and can be typed in manually or populated using the slider to the right of the Dip text box. To move the slider by a factor of one degree, click just to the left or to the right of the slider's pointer and it will move 1 degree in that direction.
5) **Azimuth**: The observed direction of dip of the bed (measured from North in a clockwise direction). This will be a value between 0 and 360 degrees and can be typed in manually or populated using the slider to the right of the Azimuth text box. To move the slider small amounts click just to the left or just to the right of the slider's pointer and it will move 1 degree in that direction.

Tool Parameters

These three input values are parameters that affect how the tool calculates and displays structure contours. Each input is initially given a default value.

The three inputs are:

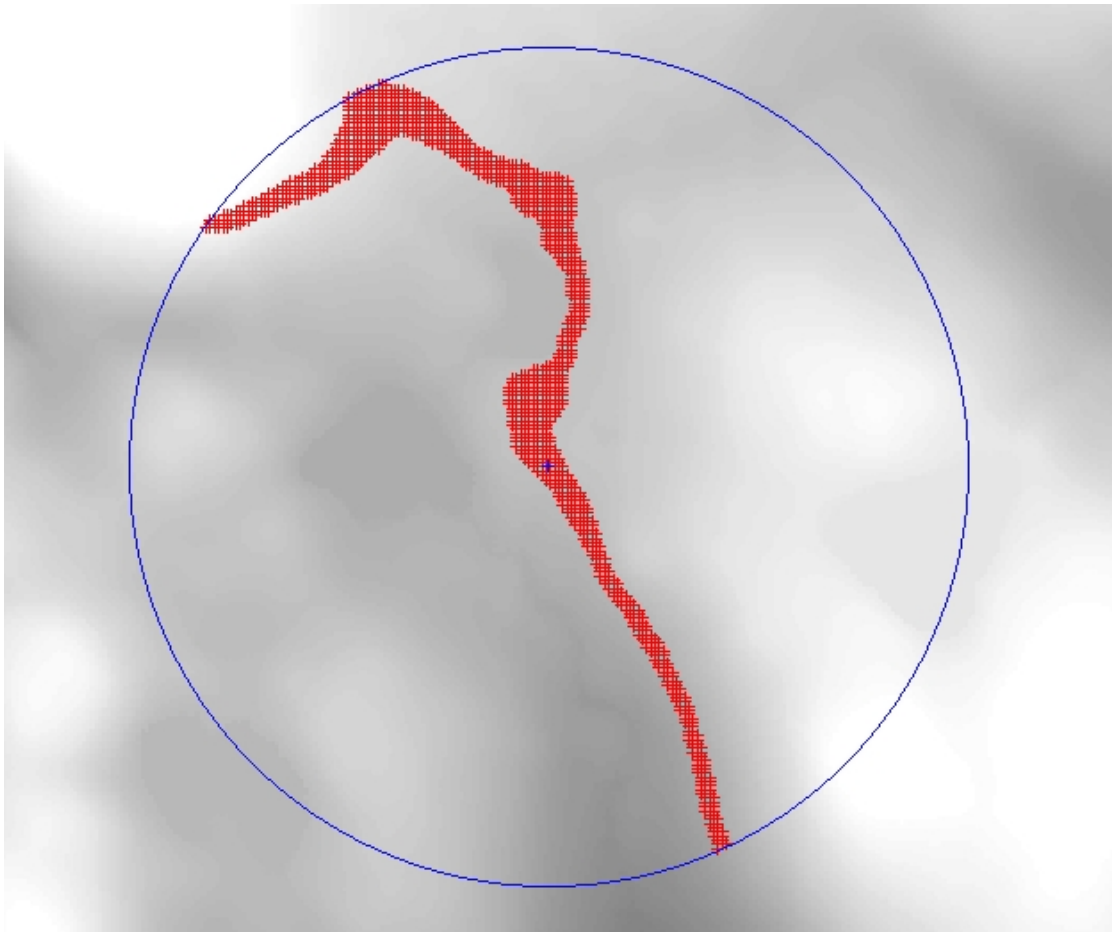
1. **Tolerance**: At various points in the search area the tool calculates the predicted elevation of the bed and compares it with the ground elevation value from the DTM to see if they are the same. The tolerance value defines how close (in meters) these two values need to be to be declared 'the same'. This value can be typed in manually or populated using the slider to the right of the Tolerance text box. To move the slider small amounts click just to the left or just to the right of the slider's pointer and it will move 1 meter in that direction. A non-integer value (e.g. 0.5) can be entered as the tolerance, but this must be entered manually.
2. **Sample Resolution**: For large search areas the time taken to produce structure contours can be high as calculations are made every 5 meters (the resolution of NEXTMap). To speed up the tool the distance between calculations can be increased. A sample resolution of 2 means calculations will be made every 10 meters, whilst a sample resolution of 3 means calculations will be made every 15 meters and so on. Obviously increasing the sample resolution may decrease the number of points found that form structure contours. This value can be typed in manually or populated using the slider to the right of the Sample Resolution text box. To move the slider small amounts click just to the left or just to the right of the slider's pointer and it will move 1 in that direction.
3. **Point Colour**: The colour used to display structure contours on the map display. Select from the pull down list of colours. Through the use of different colours it is possible to display the results of several structure contour calculations on the map display at the same time.

Search Area

These three input values are used to define a circular search area. Only structure contours that fall within this search area will be identified. The three inputs are:

1. **Easting**: The National Grid Coordinate (Easting) of the centre of the search area. This value can be typed in manually or populated automatically as the Easting of the Observation Point by clicking on the **Use Easting and Northing of Observation Point** button.
2. **Northing**: The National Grid Coordinate (Northing) of the centre of the search area. This value can be typed in manually or populated automatically as the Northing of the Observation Point by clicking on the **Use Easting and Northing of Observation Point** button.
3. **Radius**: The radius in meters of the search area. This value can be typed in manually or a value can be selected from the dropdown list.

When all of the inputs have been entered, click on the **Calculate** button to run the tool. The progress of the tool is displayed, and once completed the results are displayed on the map display as graphics. An example result is shown below:



- The blue cross is the location of the Observation Point.
- The blue circle is the search area.
- Each red cross is a location where the estimated bed elevation is within the tolerance value of the ground elevation (forming a structure contour).

Important Notes on the use of the tool:

The Structure Contours are drawn as graphics onto the map display of ArcMap. To make a permanent copy of the results they must be converted into a ShapeFile. An additional tool is provided for this purpose and is described below.

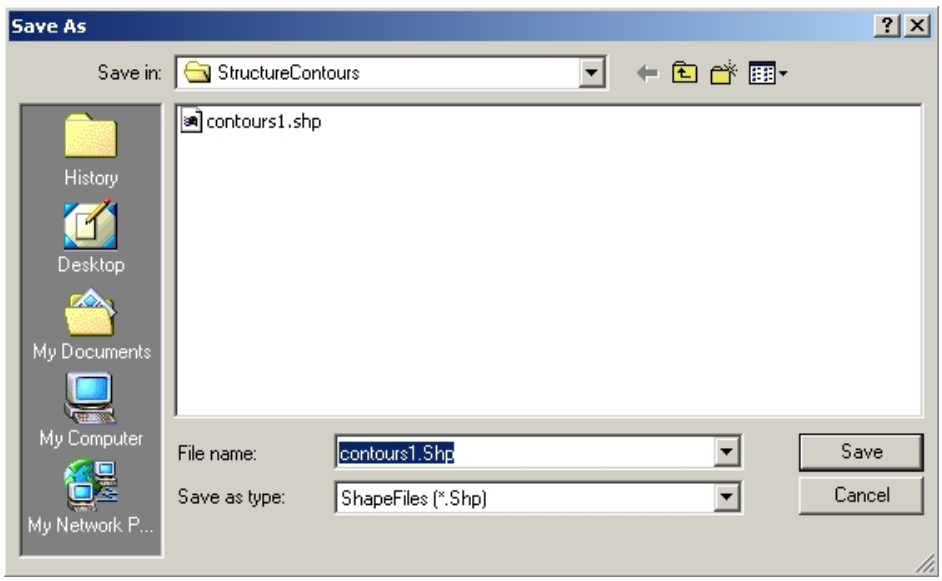
Slider controls have been included on the inputs form to simplify the process of manually entering values on a Tablet PC. The easiest way to enter a precise value using the sliders is to drag the pointer of the slider to roughly the right value (within 1 or 2) and then click just to the left or just to the right of the slider's pointer (causing the value to increment or decrement by 1) until the precise value is displayed.

5.11.2.2 DELETE STRUCTURE CONTOURS

Pressing the Delete Structure Contours button will remove the graphics created by the Structure Contour tool from ArcMap's map display. Note that any other graphics on the map display (that were not created by the Structure Contour tool) will not be removed.

5.11.2.3  SAVE STRUCTURE CONTOURS AS SHAPEFILE

Pressing the save Structure Contours as ShapeFile button allows the user to save all the points created by the Structure Contour tool to a Shapefile, which can then be retrieved at a later time. The user is presented with the following dialog:



Navigate to the required directory, enter a filename and then click on the **Save** button to complete the operation.

Note that it is possible to overwrite an existing ShapeFile, but not if that ShapeFile is currently being used in the active ArcMap project.

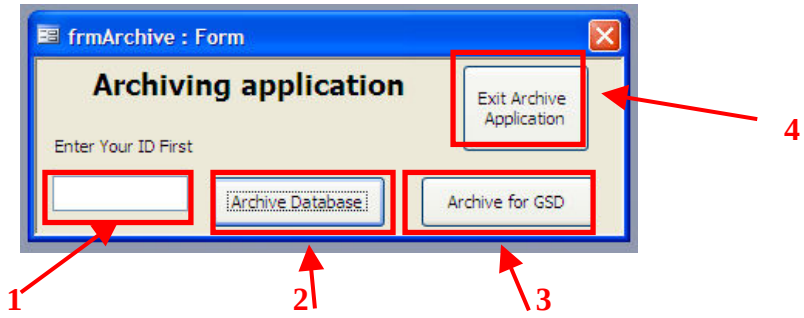
5.11.3 Limitations of the Structure Contour Tool

When choosing a DTM or multiple DTMs for the Structure Contour Tool, the user is able to select from all raster layers held in the GIS, as it is not possible to distinguish DTMs from other raster layers such as OS 50k sheets. Make sure that **only** DTMs are selected. Otherwise it is possible that the Structure Contour Tool will attempt to get elevation values from a non-DTM raster layer.

6 Archiving the Digital Field Database

There is a separate application that will allow you to archive your field database every evening and also create a version of the database which can be loaded into the GSD. This application is called ArchiveDFDC.mdb and is in the MIDAS folder, there is also a shortcut to the application which can be copied across to the desktop to allow quick and easy access to the application.

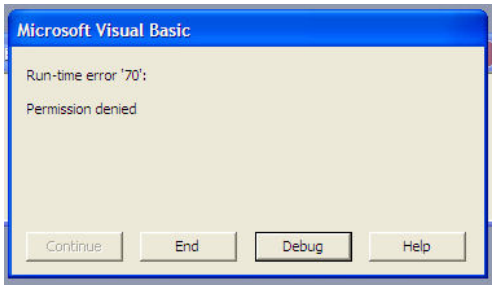
Open the application either by double clicking on the shortcut or on the actual application. The application will open and display the dialog box below.



1. Text box in which to enter you user ID i.e. NASM. You must enter this or the application will not be able to archive your data
2. This will make a copy of the database that will be saved into the BACKUP_DFDC folder. The database will be re-named using your user code and the date i.e. NASM_26082005.mdb
3. This will save out your final version of the database ready for loading into the GSD. This will make a copy which is re-named using your user code, the current date and the letters GSD i.e. NASM_26082005_GSD. Read Section 7 prior to doing this.

4. This will exit the application

THE DFDC.MDB MUST BE CLOSED BEFORE TRYING TO ARCHIVE OTHERWISE YOU WILL GET THE FOLLOWING ERROR MESSAGE:



If this error message appears then click on 'End', close the DFDC.mdb and the MIDAS ArcMap project (this holds open and link to the DFDC.mdb) then click on Archive again.

Notes:

Archive Database - It is important that you archive your database every day, this will provide a backup of the data you have collected and ensure that should anything happen to a database you are working on in the field you will never lose more than one days fieldwork

Archive for GSD – This should be carried out once you are ready to view the data in the GSD, it is not necessary to do this every day. However, before you Archive to GSD it is essential that you have already exported the tables ready for use in the GSD using the Export GSD Tables functionality which is within the main DFDC.mdb.

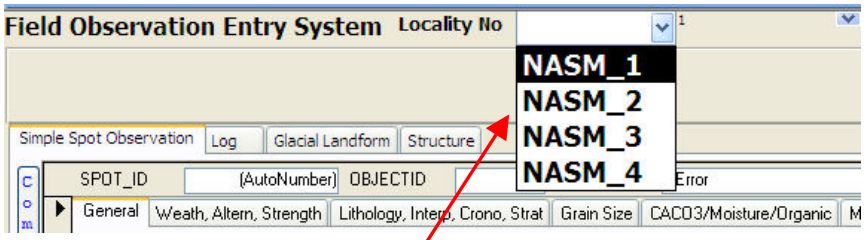
7 Adding field data into the GSD

Please note that the DFDC database has been designed using Access 2003, as a result it will not function properly in Access 2000. Therefore please do not try and use this database on your laptop or desktop.

7.1 PREPARING THE DATABASE

Before it is possible to view the field database in the GSD it is necessary to make certain changes to the database tables that will make it possible for them to be loaded into the GSD. These changes are made via the 'Create GSD Export Tables' button in the database. Clicking on this tool will prepare the database, and create the tables needed by the GSD.

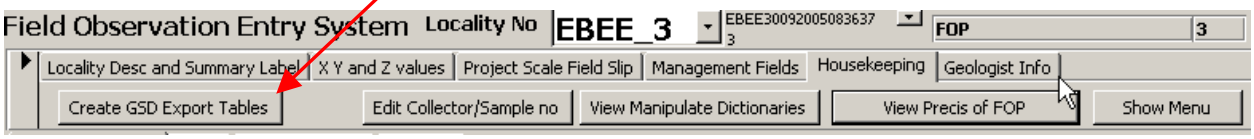
1. Open DFCD.mdb on the tablet PC
2. The main Field Observation entry System form will open – however there will be no data displayed therefore access to some of the controls is restricted.
3. To access the part of the form needed you must select a locality number from the drop down list.



Click on the drop arrow and select a locality.

It is not important which one you select.

4. Once you have selected a locality the main tabs will appear at the top of the form. Select Housekeeping to access the 'Create GSD Export Tables' button
5. Click on the Create GSD Export Tables



You must then Archive the database for use in the GSD – see section 6 for instructions on how to do this

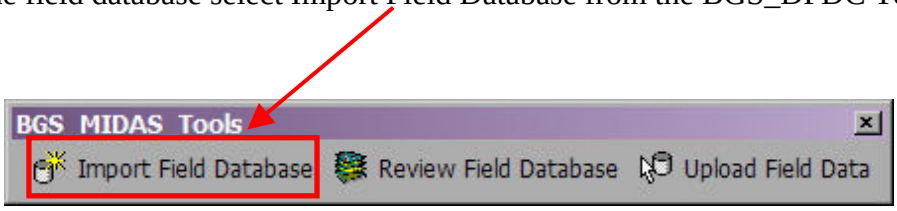
7.2 VIEWING FIELD DATA IN THE GSD

7.2.1 Importing the Field Database

Before starting it is important to ensure that you have the GSD installed on your desktop – if you are unsure please contact either Keith Adlam or Emma Bee (for Keyworth users), Nikki Smith (for Edinburgh users) or any other member of the GIS staff.

The Field Database tables can be viewed in the GSD to allow further interpretation and preparation of geological maps. The datasets are loaded into a group layer called Field Data Features followed by the name of the database that has been loaded i.e. Field Data Features_NASM_260805_GSD. The Field Observation point data are loaded as well as the locations where the main types of data have been collected i.e. Structural data locations, Spot Observations, Log locations etc.

To load the field database select Import Field Database from the BGS_DFDC Toolbar



You will be asked to confirm whether you are using a MIDAS database or a Standalone Database. Select MIDAS if you have gathered your data using MIDAS system on the tablet PC or Standalone if you have been entering data directly to the Standalone database.

This will load the following field database tables with the name of the database they have been imported from appended to the table name. i.e. GSD_COMMENT_NASM_24042006_Features

FIELD_OBSERVATION_POINT – location of all field observations taken

GSD_COMMENT – locations where comments were recorded

GSD_LANDFORM – locations of landform observations

GSD_LOG – locations of Log readings

GSD_PHOTO – locations where photos were taken from

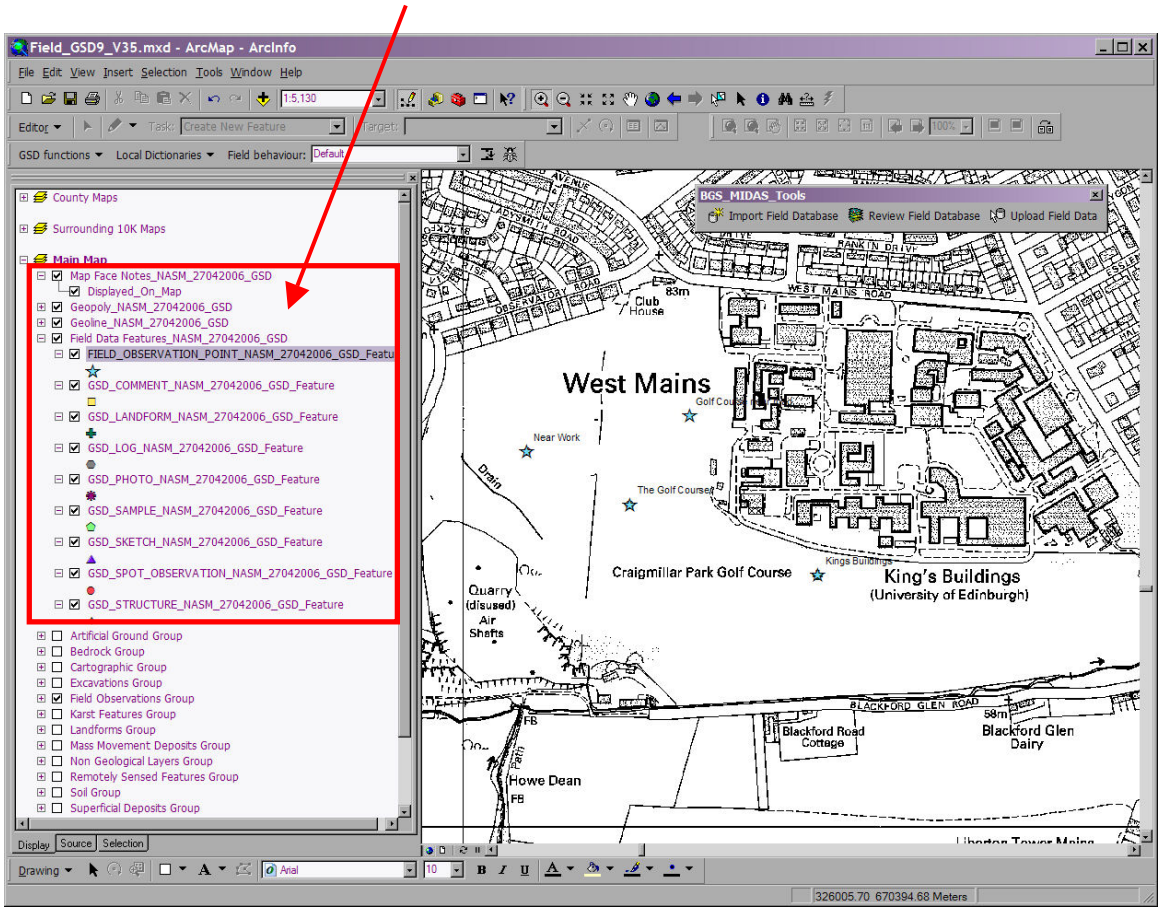
GSD_SAMPLE – locations where samples were taken

GSD_SKETCH – the locations where sketches were drawn

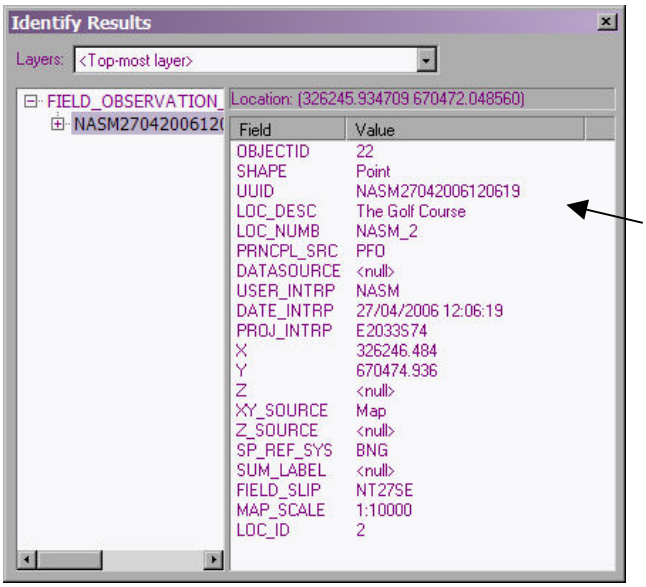
GSD_SPOT_OBSERVATION – the locations where spot observations were taken

GSD_STRUCTURE – the locations of structural observations

The Geoline, Geopoly and Map Face Notes will also be automatically loaded in from the database at the same time.



By using the 'identify' tool  to click on the point of interest on the map it is possible to see the data recorded for each type of observation point.

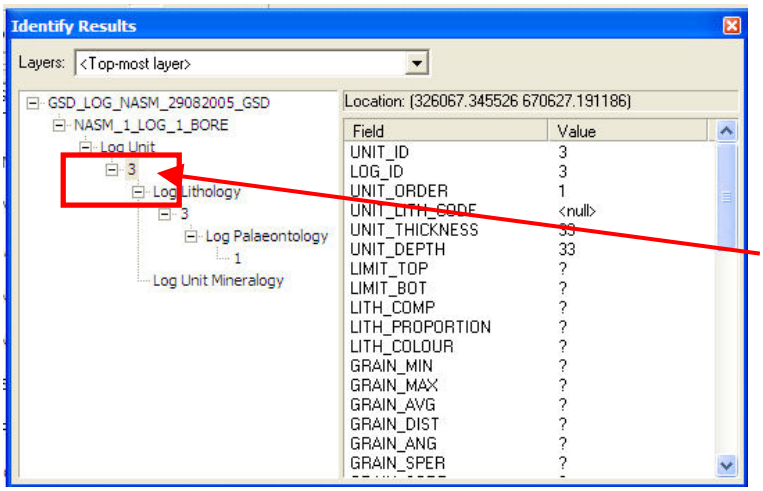


Basic Attributes recorded for each Field Observation Point

Spot Observation and Log have additional information linked to them from the database. This information is also viewed using the 'identify' tool. Click on the Log or Spot observation point of interest, the identify results box will appear as normal.

Within the Identify Results dialog box on the left hand side you will also see the list of tables that are related to the point you have selected. If there is a + sign next to the table name it

indicates that there is data of that type available for that point. To view the data click on the + sign and select the number that is displayed and you will see the data. If that particular table has another table related to it then clicking the + button will also display any further tables containing relevant data.



For example – to view the unit information related to this borehole click on the number 3 and the data will be displayed on the right hand side

It should be noted that the number is simply ArcMap's internal reference to the data and is not part of the data itself.

It is possible to view the Field Database for more than one geologist within the GSD by clicking the Import Field Database button again and selecting another database. Each table is named in the Table of Contents using the name of the database (which contains the username of the person who collected the data) as well as the table name, this means it is easy to identify which geologists data you are looking at.

7.3 REVIEWING THE FIELD DATABASE

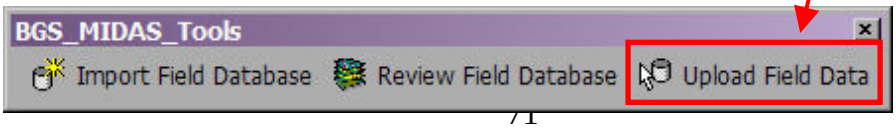
It is possible to review all the data recorded for a single Field Observation point by using the Review Field Database tool which will open the database and allow the viewing of the data via the forms. This works in almost exactly the same way as the Edit functionality in the MIDAS system, except that it will not be possible to edit the Field Database via the GSD.

To review the field database select the Review Field Database tool from the BGS_DFDB_Upload toolbar.

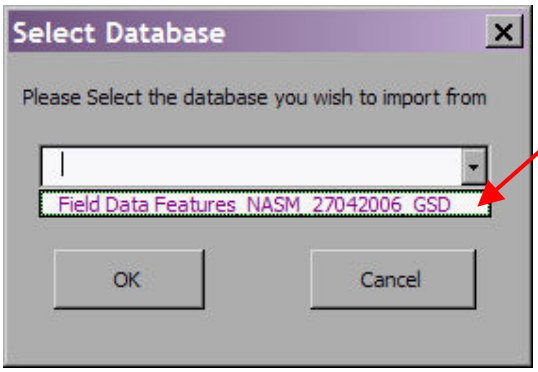
Click on the Field Observation point of interest and the GSD version of the field database will open. The data can then be viewed through the database forms in the same way as you would view them in the MIDAS system.

7.3.1 Upload Field Database Tables to the GSD Feature Layers

Some of the data collected in the field can be loaded into the GSD Feature Classes. When you wish to load your data to the GSD then click on the Upload Field Tables button on the BGS_DFDB_Upload toolbar.



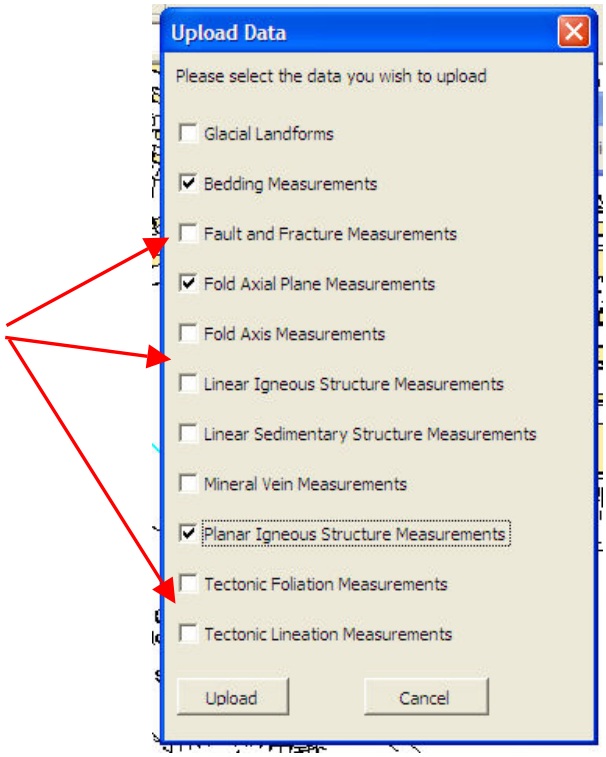
You will be asked to select which database you wish to upload from – this is important if there is more than one field database imported into the GSD project.



Select your database from the drop-down list and press OK

This will open a form in ArcMap that will allow you to select which data you wish to upload.

Select the data you wish to load by checking the boxes next to the relevant datasets. Click Upload and your data will be appended into the relevant GSD tables.



The system will check through the data in your GSD project database and only upload any new data, this means that even if you have already uploaded your data earlier in your field season you will not find duplicates of your data in the GSD tables.

.

VIEWING SKETCHES ON THE DESKTOP

You can use the précis tool (green “i” tool) in MIDAS to view your sketches, or you can use the edit (red flag) tool to edit a geological observation and also edit the associated sketch (if there is one). The sketch tool on the Tablet PC works with .ANT files in their native format, but it also saves a JPG file that you can use on your desktop PC when you have returned from the field.

These JPGs will be transferred to ImageBase for Corporate storage and maintenance.

8 Troubleshooting, bug reporting and feedback

Most bugs have been error trapped within the system either through the provision of a message box telling you what the problem is and how to alter it or through internal code. However, it is impossible to confirm that you won’t encounter any errors. If you come across any, the developers would find it very valuable if you can document the error so that it can be fixed in a later release. Be patient with the system. There is a lot of code working in the background to reduce the amount of data entry and button pushing you have to do. This takes time to run, so occasionally you might find things don’t work as quickly as you may like.

Some common errors include:

- Not having the GeoPoly, GeoLine, National grid QS or Field observation point loaded into the GIS. These must be loaded, with the correct layer name spelling as in the Blank MIDAS GIS.
- If whilst you use the MIDAS system you get asked to enable macros in Access rather than viewing a data entry form, it is likely that you haven’t set the security level to be low in Access. You will need to open the DFDC.mdb in Access 2003 and select Tools > Macro > Security and set the security level to low. This ensures that macros built in the system will work when fired up from ArcGIS.
- The DFDC.mdb has been renamed. This should never been renamed as the code between ArcMap and Access relies on knowing the access database filename. It should only be renamed when moving to be used in the GSD or being backed up, and even then, the database does this automatically through a push of a button.
- If there is more than one version of the same .mxd open, or two MXD’s pointing to the same geodatabase open, this can cause problems with the code. Only use one .mxd project at a time.
- If the user has changed a button image using the customize button, this seems to upset the default path for editing and the editing tools will no longer work without falling over in the code. If this happens, refresh the code in the VBA editor and go to file, save as and overwrite the project. This resets the correct path.
- If the integrated GPS is not receiving a signal, check that the Baud rate is set to 4800 and turn the Bluetooth hardware off and back on again be pressing the hardware button on the back of the GoBook.

When you download the empty MIDAS database from W:\ISD\3DGSystems\Data\SIGMA\DFDC\MIDAS\ there will be a folder called ‘Feedback’. In this folder are two word documents, which are blank except for a few headings. Rename these and use them whilst in field digs to record and report any bugs or feedback you may have. Constructive comments are always gratefully received and your comments and feedback are invaluable to the future development of the system. Collate your notes with the other members of your project team and send them to Colm Jordan when they are finished.

9 Office based training day

DAY 1

The day is designed to familiarise users with the tablet PC and the MIDAS system. There will be several demonstrations, but also lots of practical time to really get used to the systems and tools available in MIDAS. There will also be time for discussion. An outline to the day is shown below, times are approximate.

9:30 – Introduction

Session 1: (10:30) Introduction to the Tablet PC and accessories.

Log onto tablet and customise pen options

Set task bar to auto hide

Set Access security level to low

Coffee (11:00)

Session 2: **(11:15)** Loading MIDAS and setting up project defaults.

Load MIDAS onto Tablet

Open MIDAS

Load usernames to dropdown list

If names missing, make a note.

Close MIDAS and open the database – populate appropriate dictionary.

Load project name and mapping scale

Check defaults are correct.

Project dictionaries.

Sample set up.

Session 3: **(12:00)** Overview of the MIDAS

Go through GUI – don't click buttons just show map tips.

Set up optimum screen size

Consider different data – map face note

GeoPoly

GeoLine

Notebook – summary label

Lunch (13:00)

Session 4: (13:45) Strike line tool – demo

Session 5: (14:10) Using the integrated GPS

Coffee (14:50)

Session 6: (15:00) Detailed look at notebook application
Spots
LOGS
Landforms
Structures
Comments
Sketches
Photos
Samples

Session 7: (16:15) Transferring data to the GSD
Viewing journal sketches.

Session 8 : (16:45) reporting bugs/ feedback
Session 9: **(17:00)** Discussion (All) - Future upgrades.

Day ends (17:30)

10 Field day to practice data collection

Day 2

Following on from the office-based introduction to MIDAS, the 1-day field-based component of this course aims to provide users with an opportunity to practice using the system to capture a range of geological information.

Two locations will be visited, each located on the Melton 1:50k Sheet, within 15km of Keyworth. We will stop to buy lunch supplies when travelling between localities – any drinks / snacks etc for the morning should be bought in advance. The plan for the day is as follows:

8:30 **Group meets in BGS Keyworth training room**

Collect DCFD equipment, tape measures, augers etc.

All members read, understand and sign H&S instruction.

8:45 - 9:00 **Depart from BGS Keyworth front car park**

Group will travel in several BGS cars directly to first locality.

9:30 **Arrive 1st locality – layby on north side of road between A46 and Thrussington [464050, 316380] (see map)**

The group will conduct a NW-SE auger traverse over approximately 400m of moderately-well featured ground underlain by a superficial succession of Anglian deposits.

MIDAS will be used to record observations (auger descriptions, spot observations, sample collection), whilst the local GIS will allow users to check contextual information, record "GeoLine" objects and plot the location of data points.

11:45 **Depart 1st locality**

Stopping to buy / eat lunch en route.

12:30 **Arrive 2nd locality – grass verge adjacent to Brown's Hill Quarry, Holwell [474200, 323540] (see map)**

The group will undertake bedrock section and structure logging within a disused ironstone quarry.

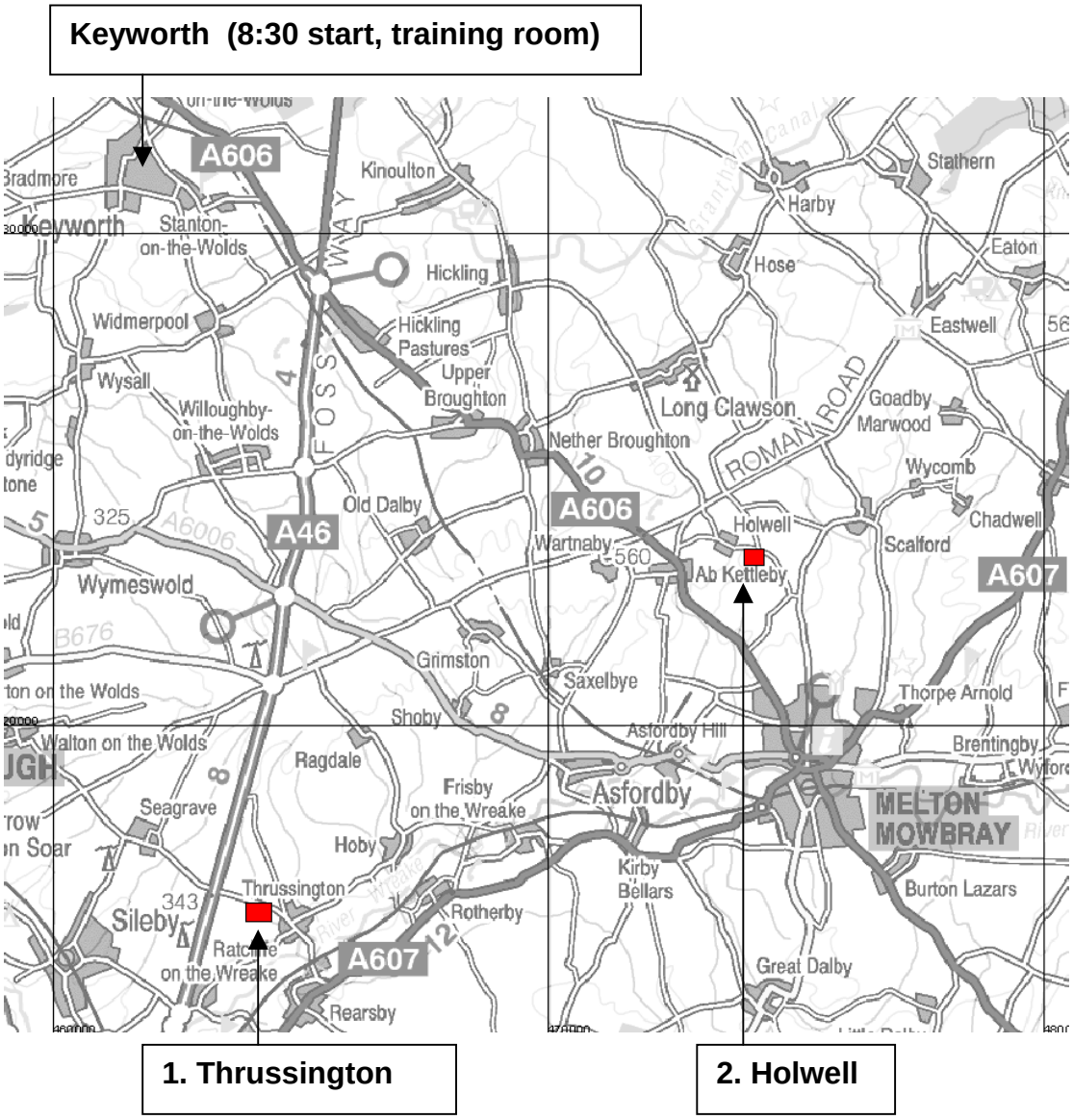
MIDAS will be used in conjunction with the sketch facility to record observations (section descriptions, structure, mineralization, sample collection). The local GIS will provide contextual information and allow users to record linework including Artificial Ground.

Please note this site is designated is a RIGS, and we are not permitted to hammer (http://www.lrwt.org.uk/pp/Silver/viewSilver.asp?ID=302).

16:00 Depart 2nd Locality

Depart for Keyworth / airport / train station.

Issues relating to post-fieldwork data handling, including the transfer to corporate servers and import to allied applications, will be dealt with at a later date by corresponding development staff in the Edinburgh / Keyworth offices.



Appendix 1 Home Use PC Modem Access:

Logging onto your Laptop:

When connected to the BGS Network:

User Id: <your login id>

Password: <Same as your login password on your desktop PC>

Domain: BGS

When disconnected from the BGS Network:

User Id: <your login id>

Password: <Same as your login password on your desktop PC>

Domain: KWPxxx(xxx will vary depending on which laptop)

If the Domain option is not visible, then click on Options.

Internet access:

To access the Internet via your modem, connect the laptop to a phone socket using the cable provided and the modem socket on the left hand side of this laptop. Double click on the Modem Connection Icon on the Desktop. This will connect you using a Freeserve test Id. You can use this ID for Modem Internet access but it would be preferable to create your own id. The details of the id are:

Telephone Number: 0845 0796699

User ID: keyworthsite.freeserve.co.uk

Login ID: keyworthsite.freeserve.co.uk

Password: bgs001

Modem Access and "9 for an Outside Line":

To change this option, Click on;

- Start
- Settings
- Control Panel
- Phone and Modem Options
- Edit

You can know enter or delete the necessary digit depending on your location.

Reading your email from Offsite:

Note that this option requires that JAVA be enabled on your web browser.

URL Nottingham: kwnts2.nkw.ac.uk/exchange

URL Edinburgh: mhnts2.nmh.ac.uk/exchange

For users who travel a lot it is possible to access their Exchange e-mail via a web browser. By selecting the appropriate URL you should get a window similar to the following one (either URL will do):

Figure 1

In the **Log On** box enter your normal Exchange id (probably the same as your NT logon id) then click the mouse just below this box (where it says click here) and you should get the following window:

Figure 2

You now need to enter your username and password……remembering the case settings. The username must include the domain name so should be **BGS/USERNAME** where USERNAME is your normal NT domain id. This will then give you the following window

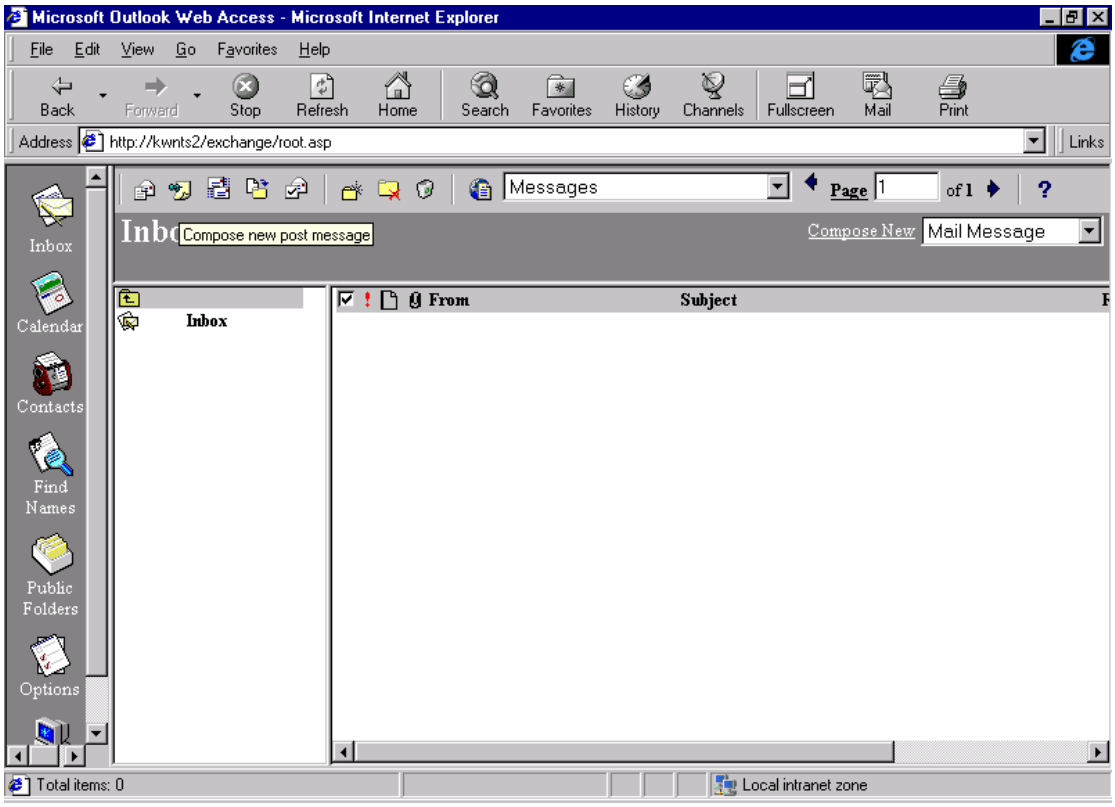


Figure 3

This now allows the user to send and receive e-mail. The icons in the toolbar cover such things as composing a new mail message, checking for new mail, moving and copying of folders, deleting items, creating new folders, deleting folders, etc.